CONSERVATION OF AUSTRALIAN SNAKES, OTHER REPTILES AND FROGS.

By: Raymond T. Hoser. 170 Lawson Street, Redfern, NSW, 2016, Australia.

Contents: Introduction - A brief overview - Threats to reptiles and frogs in Australia - Conservation needs of reptiles and frogs in Australia - Conclusions - Acknowledgements - Selected references.

INTRODUCTION

One of the primary aims of this and other herpetological journals is to improve conservation efforts with respects to herptiles, which have suffered greatly in the past. This paper deals with conservation of Australian reptiles and frogs from an Australian viewpoint. Although discussing reptile and frog(amphibian) conservation from an Australian perspective, many of the points raised in this paper will be pertinent to other countries from the point of view of local conservation efforts and also for combatting smuggling, etc. The following information is essentially the same as that in a recently written book "Australias' Reptiles and Frogs in Colour", by the same author (not yet published).

In discussing conservation of Australias' herptiles I will be giving personal opinions based on facts, some of which are not referred to here. It is hoped that interested readers will investigate some of the references cited, so that they may see how the conclusions reached were made. No references will be cited in the main text of this paper, although a list of 'selected' references are at the end of this paper.

A BRIEF OVERVIEW

Australias' conservation record is arguably one of the worst in the world (on a population versus land mass basis). Australia holds the dubious distinction of being the only nation on earth to have exterminated a reptile through nuclear means. In the 1950's the British were allowed to test atomic bombs on an offshore West Australian island, killing off an endemic legless lizard (*Pygopodidae*).
Reptiles and frogs need not only be conserved for conservations' sake. They also constitute a valuable natural resource. For example venoms of some species may prove useful in the manufacture of drugs, whilst many species eliminate 'pests' such as introduced mice, rats, insects, etc.
There are about 1,000 species of reptile and frog found in Australia, and adjacent seas (12% of the world's species), including undescribed forms. Although there is an estimated population of about 15 billion herptiles in Australia, many species are rare, have restricted distributions, or both. An annual mortality rate of about 4 billion is replaced by a similar number of 'new specimens'. However about a quarter of the species known are known to be in a state of either moderate or serious decline. It is these species, to which we should be devoting major conservation efforts.
With herpetological research in this country in a relatively backward state, it is hard to define 'rare' or 'endangered' species, let alone define those terms themselves. However species in 'serious decline' include the following, Broad headed snake (*Hoplocephalus bungaroides*), Death adders (*Acanthophis* spp., all forms), and Western black striped snake (*Neelaps calonotus*).

THREATS TO REPTILES AND FROGS IN AUSTRALIA

The main threats to herptiles within this country are all as a result of human activities past and present. In order of importance the main problems facing our herptiles are:

1. Habitat destruction and/or modification.
2. Introduced 'pest'species.
3. So-called protective legislation, 'inconsistent' fauna authority officials, and smuggling rackets.
4. Over collection of specimens by reptile and frog keepers, and hunters within Australia.

CONSERVATION NEEDS OF REPTILES AND FROGS IN AUSTRALIA

1. Habitat protection.
2. Elimination of 'pest'species.
3. Captive keeping, breeding and research.
4. Useful protective legislation for species and habitats.
5. Stopping smuggling and corruption within wildlife authorities.

1. Habitat protection.

In virtually all cases, reptile and frog species will not be threatened from collecting activities, shooting, etc. which could effectively be called 'harvesting a resource'. 'Collectors' only remove about 30,000 reptiles from the wild annually for pets (and their food), on a national basis. Humans directly account for a further estimated 10 million herptile mortalities, mainly by running them over on the roads. Despite these numbers killed, the vast majority of specimens die without direct human influence, and are only threatened (on a species level) by permanent displacement through loss of habitat.

Populations appear to be able to withstand removal

of specimens so long as enough specimens are left to support a viable breeding population. The cryptic nature of most species would make it virtually impossible to remove all specimens from most populations even if one consciously tried to do so. Most reptiles and frogs do however have very specific habitat requirements. Many species can only survive in virgin ('untouched') habitats. Some examples include Red crowned toadlet (*Pseudophryne australis*), Death adders (*Acanthophis* spp.), Broad headed snake (*Hoplocephalus bungaroides*), and Rough scaled snake (*Tropidechis carinatus*). Other species can only tolerate a certain amount of habitat 'modification' before being eliminated. (It should be mentioned here that a few species actually seem to benefit from certain types of habitat modification; usually clearing vegetation or providing a water supply. Some notable examples include, Green tree frog (*Litoria caerulea*), Grass skink (*Lampropholis guichenoti*), Common brown snake (*Pseudonaja textilis*).

Most reptiles and frogs that are currently threatened within Australia are those species which have relatively strict habitat requirements, and whose habitats are under destruction. Examples include the Dwarf form copperhead (*Austrelaps superbus*(?), and Broad headed snake (*Hoplocephalus bungaroides*). Some 96% of habitat within Australia has been modified since settlement (1788), and about 92% of the land area is currently used for grazing or other farming activities. Currently insufficient viable samples of various types of natural habitat are being preserved within Australia in the form of national parks, forestry areas and such like. Although rainforests and some other 'threatened' habitats are justifiably receiving attention and being protected (usually in insufficient amounts), other important habitats are simply being destroyed without even a whimper from most of the Australian public. Overgrazing and deliberate repeated

burning is destroying most 'spinifex' habitat and associated wildlife communities throughout many parts of northern inland Australia. Virtually no 'untouched' bushland now exists in the drier half of NSW and Victoria and many species of reptile, frog and other wildlife have all but disappeared from these areas. A number of other habitats are also being ruined without a rational assessment of the consequences.

Obviously 'progress' is neccessary, however Australia has an immense land area with relatively few people, and it should be relatively 'easy' to preserve more areas in the form of national parks, and similar. These in themselves are a recreational, scientific and cultural resource.

In many parts of Australia, the old saying "If it moves, shoot it, if it does not, then chop it down", still applies. As the majority of Australias' area is used for farming practices it is important to educate these people into realising the need to minimise 'exessive' habitat modification, and 'bad farming practices' which can lead to salinity, erosion and other problems. Those practices can contribute to a decline in reptile numbers over large areas, and it is in this area that more conservation resources should also be directed.

2. Elimination of pest species.

'Pest'species are those which were introduced by humans from overseas into the country, and which have multiplied to become a threat to other wildlife and/or human agriculture.

Certain 'pest species' eliminate reptiles and frogs and are a major threat to many species. these pests are particularly destructive as they can freely move into otherwise 'untouched' areas and eliminate species from these places. For example Water buffalos have trampled swamps in Kakadu national park (N.T.) and elsewhere, elimina-

ting many species of frog that would otherwise breed in the vegetation bordering these swamps. Even crocodiles suffer by having their nests trampled by the buffalos.

Some other pests that are having a major effect on herptile populations and may help to eliminate species include the following:

1. Cane toad (*Bufo marinus*), eliminating frogs and frog eating reptiles from most parts of Queensland, and nearby areas.
2. Mosquito fish (*Gambusia* sp.), eliminates frogs by feeding on all types of tadpole. Snakes then suffer from lack of available food. Currently found near most populated parts of the country.
3. Cats and foxes, kill all species of wildlife. Reptiles are however usually the dominant food, particularly in arid areas. Found Australia wide.
4. Rabbits, goats and stray farm animals, by removing ground vegetation leave many species open to attack by birds and other predators. Found in most of Australia.
5. Pigs, feed on eggs from nests of reptiles, particularly tortoises, turtles and crocodiles. Found Australia wide.
6. An enormous number of introduced plants which by displacing native vegetation, change habitat suffuciently to cause certain species to die out. Some plant pests include, Lantana, Privet, South African Boxthorn, Mimosa, and Water hyacinth.

These pest species should be eliminated. Despite a number of concerted campaigns by the author to get the federal government to take steps to exterminate the Cane toad, before it wipes out more species, no action has yet been taken. Although (fortunately), no new pest species are being introduced into this country deliberately, as happened in the past, conservation efforts should be directed at biological means of removing current pests.

The Australian conservation movement seems to be largely blind of the threat posed by pest species to all forms of wildlife, however it seems to be slowly waking up to this threat.

3. Captive herptiles, their breeding and research.
In order to conserve reptiles and frogs, one needs to know about what one is trying to conserve. It is believed that some species of Australian herptile were made extinct even before they were discovered. A number of species are in serious decline for no apparent reason (for example frogs of the genus *Taudactylus*). Urgent research is needed on these species.
The more that is known about reptiles and frogs, the easier it becomes to develop useful conservation strategies based on sound scientific facts rather than emotions. Limited resources can be directed at conserving those species that are most endangered. Also with greater knowledge about our native herptiles it will become easier to take measures that will prevent more species from declining in numbers.
Insufficient government and other funds are at this stage allocated to herpetological research, and the training of professional herpetological workers, probably due to the relative lack of economic importance of most herptiles. More importantly however most research on reptiles and frogs has traditionally been done by unpaid amateur herpetologists, keepers, etc. The problem within Australia is that activities by corrupt and misdirected fauna authorities has almost wiped out

Photo 1. Green python *Chondropython viridis* . Subadult. The specimen shown was captive bred in the USA, and smuggled into Australia where this snake is threatened by habitat destruction, and now very rare.

Foto 1. *Chondropython viridis*. Foto: Raymond T. Hoser.

the amateur herpetological community. In 1973 there were an estimated 4,000 amateur herpetologists and keepers within Australia. By 1980 the number was down to less than a thousand. In 1980-1982, unconservationist influences within a Sydney herpetological society, sponsored by local wildlife officials actually resulted in the disbandment of a previously important herpetological membership of about three hundred (combined), with memberships continuing to decline. Not only has research suffered as a result, but so too have other aspects of herptile conservation.
The author believes that it is desireable for conservation reasons for as many people as possible to keep herptiles in captivity ('as pets').
The primary reason is that by keeping herptiles people will usually go through a logical progression that will only aid the conservation cause.

1. They learn more about herptiles.
2. This knowledge is passed on to friends, others, etc. (the general public).
3. As the public becomes more knowledgeable about herptiles they will more easily see the reasons to conserve them, and more importantly will hopefully alter their actions in relation to herptiles (too many Australians still kill

Photo 2. Oenpelli python *Morelia oenpelliensis*. Adult, from Alligator River, N.T. This species exceeds 3 m but was only scientifically discovered in the 1970's. It appears to be reasonably common where it occurs.

Photo 3. Newborn Woma *Aspidites ramsayi*. This distinctive juvenile colour form came from Charleville in South West Qld.The only person to have bred this species successfully in Australia is an "underground" herpetologist (that is one who holds reptiles without permits, and also avoids the risk of NPWS break ins for stock supplies).

Foto 2. *Morelia oenpelliensis*, Alligator River, N.T. Foto: Raymond T. Hoser.

Foto 3. Juvenile *Aspidites ramsayi*, Charlieville, southwest Queensland. Foto: Raymond T. Hoser.

snakes on sight).

4. Some but not all keepers will go on to do captive and/or field research on herptiles, and by publishing in journals, etc., more details about herptiles will be known (further aiding conservation planning).
5. Almost all professional herpetologists had made the decision to embark on a herpetological career after keeping herptiles as 'pets'.

Many species of herptile will become extinct in the wild as a result of irrepairable habitat destruction or for some other reason. Remaining specimens in the wild that are obviously going to become extinct should be caught and captive bred, and if appropriate, relocated elsewhere. For some species, the only way that they are going to survive is by captive breeding (the Round Island boas are a classic case, where fast actions by herpetologists in the northern hemisphere have saved three species by captive breeding. The boas had had their entire habitat destroyed by feral goats). All species of reptile can be bred in captivity. Captive breeding can also serve to repopulate

Photo 4. Stimson's python *Liasis stimsoni* from 'The Tits' W.A. This specimen was stolen from the author on 8 May 1981. After legal actions against NPWS officers, the snake was returned (with others) on 31 July 1981. All had evidently been sterilised (X-rayed) as they failed to reproduce after that date.

Photo 5. Ant-hill python *Liasis perthensis* with two eggs. The author is the only person to have bred this species to date. The author is currently taking action against NSW fauna authorities for illegal theft/seizure of specimens of this species. Another important captive breeding/research programme was terminated by their actions.

Foto 4. *Liasis stimsoni*, The Tits, W.A. Foto: Raymond T. Hoser.

Foto 5. *Liasis perthensis*. Foto: Raymond T. Hoser.

areas where a given species has been exterminated, or the population has dropped below replacement level.
(Extreme care should be taken when considering releasing any herptile into the wild. Ideally the herptile should only be released where it or its parents originated. If this is not possible then a specimen should only be released in an area containing genetically similar specimens and where the specimen will survive. A specimen should never be released too far from its point of origin as this may affect the 'local' gene pool and play havock with scientific records should it or its offspring be re-captured. Should for some reason it not be possible to release a specimen close to its point of origin one should attempt to find a captive home for the specimen or kill it (State museums always are in need of specimens). If the species is rare or endangered, it goes without saying that no specimen should ever be killed).
To embark on a successful large scale captive breeding programme to save a given species, usually involves at some stage, several hundred specimens. Usually no one person or organisation has the resources nor inclination to hold such a large number of specimens, so it becomes important to have available a large 'pool' of keepers with which to distribute the specimens. Australia currently lacks this, and I believe that the development of a large 'pool' of reptile keepers and breeders should be a major conservation objective. Most research on herptile biology, including feeding and breeding behaviour can only be done on captive specimens.
The author and a few other have held viable breeding colonies of a few types of herptile (usually snakes), however most captive breeding programmes relating to rare and endangered herptiles are being carried out in the United States and Europe (this includes Australian forms).

Assuming that rare or endangered species are not taken from the wild, taking specimens from the wild in a responsible manner for any reasonable purpose should be encouraged. 'Overcollecting' of specimens by Australian herpetologists is sometimes a problem. However when it occurs it usually only results in 'local' extinctions of relatively widespread species. In the late 1960's much 'overcollecting' of Broad headed snakes (*Hoplocephalus bungaroides*) occurred in areas near Sydney, NSW. However even in this case the snakes would probably have been largely exterminated within ten years through habitat destruction (removal of 'bush'rock).

Those who claim that keeping herptiles in captivity is always cruel are not telling the truth. Any properly kept herptile is infinitely healthier (and often has a better sex life) than their counterparts in the wild. After all, properly kept captive herptiles have plenty of food, no predators, no internal parasites, optimal temperatures provided, etc.

4. Protective legislation.

When drafting herptile protection legislation, all Australian states have tried to 'keep in line' with one another, and consequently all have similar rules and regulations.

Although I believe in the nessessity to 'protect' reptiles and frogs, current legislation in force in all states is not appropriate for several reasons.

Current legislation relies on one or two main points. These are:

1. Prohibition on catching and keeping all or most species.
2. The state fauna authorities issuing permits to take, keep or kill herptiles. This entails herpetologists' finest details going onto a central register.

Most species of herptile within Australia are not endangered and usually common where they occur. With the exception of a few species, none are of major economic value as a 'resource'. Whether or not they have 'statutory protection' has no significance to them or their conservation status. By issuing a blanket 'Prohibition' on these herptiles is strongly counterproductive. Most importantly, the huge number of public servants required to administer the'prohibition' is a gross misdirection of resources, that should be directed at more immediate conservation problems. With 'Prohibition' most people are discouraged from keeping herptiles thereby reducing the long term conservation effort (see previous section). Those who still want to keep, or do research on these species will have to direct valuable time and effort into going through bureaucratic red tape, which would be better spent doing research, etc. Those who do not go through the 'correct' channels may find themselves breaking laws and labelled as criminals for relatively innocuous activities. All of which does little for the conservation cause.

Photo 6. Broad headed snake *Hoplocephalus bungaroides*. This species is restricted to sandstone country near Sydney, NSW, and breeds readily in captivity. However no major breeding programmes have been in place since the early 1970's and this species is in serious decline. Captive breeding is an important requirement in saving this species from extinction.

Photo 7. Death adders *Acanthophis antarcticus* copulating. Grey is the 'recessive' colour. This species has been more often bred in captivity than any other venomous Australian species. It is in serious decline in the wild through habitat destruction.

Foto 6. *Hoplocephalus bungaroides*, Blue Mountains, N.S.W. Foto: Raymons T. Hoser.

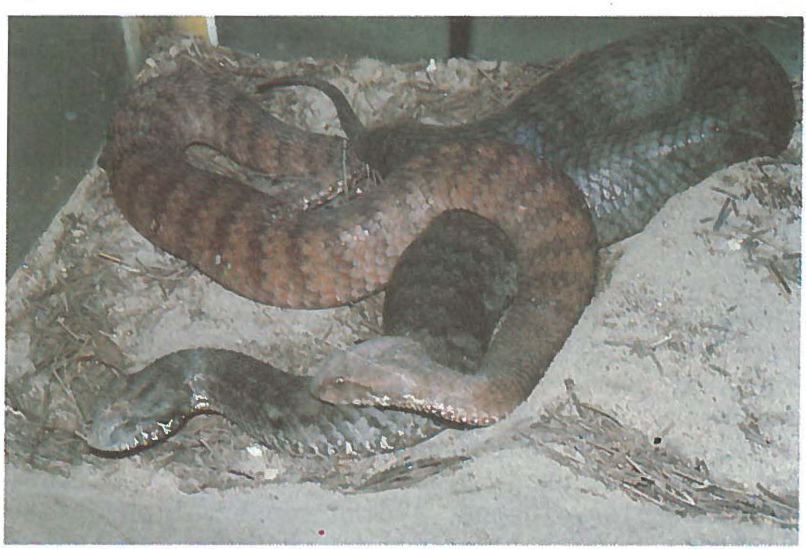

Foto 7. *Acanthophis antarcticus*, in copula. Foto: Raymond T. Hoser.

(Tactics of fauna officers in most states regularly put keepers, researchers, etc. 'outside of the law' even when complying with all regulations and directions given - see references).
The species that are truly endangered do not receive the neccessary attention when a 'blanket prohibition' is in force. In the long term the situation becomes worse as the number of herpetologists reduces, and even less is known about these endangered species.
The permit issuing system, especially in states with a 'prohibition' on the collecting and keeping of reptiles, puts all enthusiasts onto a single register adminstered by very few people. Because there is 'big money' in reptile smuggling, and reptile conservation and keeping are not often in the public spotlight, the permit system, as it stands is wide open to corruption, (see next section) leading to huge problems.
At this point in time corruption in the upper levels of state fauna authorities has been repeatedly alleged in at least three states (NSW, QLD, SA), (see references for details), so it must be assumed to be a major problem (real or potential). I have taken actions against officials of NSW fauna authorities, and their 'inconsistent activities' have been widely reported in the Australian press.
The key to 'new' legislation should be to 'De-protect' all but the endangered species. Immediately most reptile and frog keepers would not have all their details in a central register and they would become considerably less vulnerable to the predations of over zealous fauna officers, break ins by smugglers, etc. 'De-protection' would enable money to be spent elsewhere on conservation, and simultaneously encourage new people to enter the field of herpetology further aiding conservation.
Although permits may still be required for 'endangered' species relatively few people would be

covered by these permits.
Currently in present state laws, all 'protected' herptiles and captive bred offspring remain effectively 'Crown' (government) property. In order to increase the incentive to captive breed rare species, it should be legislated that the state have no control over captive bred young. Breeders should have the right to buy and sell specimens that are captive bred (one will have to find a way to prevent the problem of people obtaining stock from the wild and then claiming that it is 'captive bred', at least for endangered species).
Current fauna legislation gives fauna officers considerable rights of entry to property. Under 'normal' circumstances a law abiding citizen would not object to fauna officers having the right of entry to check on fauna held. The following documented case is given as just one reason why laws should be amended to prevent fauna officers from entering a herptile keepers' house under any circumstances without taking the herptile keeper to court to get court approval to gain entry (for 'good reason').
On 27 March 1984 some NSW fauna officers did a 'routine check' of the authors premises and snakes held (all legally held of course). I did not realise it at the time, but my house was being'cased' for a break in. On 10 July 1984, the same men broke into my house, smashing doors, etc., and stole snakes, files, cash, computer disks, camera equipment, etc. The fauna officers who initially denied being involved in the break in, were only caught after the break in, because neighbours recognised them from the previous 'inspection'. (See references for details).
Perhaps more importantly some form of 'habitat protection' legislation should be enacted to protect the habitats of endangered herptiles, as ultimately this may be the key to the survival of many given species.
It is incredible that even now some species are

Foto 8. *Acanthophis pyrrhus*, in copula. Foto: Raymond T. Hoser.

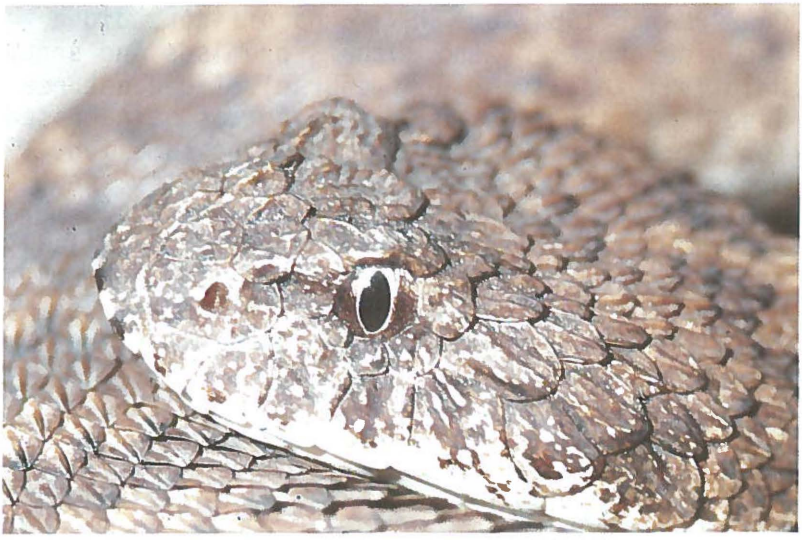

Foto 9. *Acanthophis pyrrhus*, mannetje/male. Foto: Raymond T. Hoser.

being knowingly wiped out due to the destruction of their last remaining habitat, often by government instrumentalities which are immune from prosecution. A classic example is the Loveridge's frog (*Philoria loveridgei*), of northern NSW, which is currently threatened by logging of its habitat. Unfortunately the drafting of any 'corruption resistent' habitat protection legislation will be a very difficult task.

5. Stopping smuggling and corruption within fauna authorities.

The 'inconsistent' activities of officers of the NSW National Parks and Wildlife Service, and of the mechanics of smuggling wildlife out of Australia have been well documented elsewhere (see references), and I strongly advise interested readers to seek further information in relation to this.

Wildlife smuggling, though illegal, is a booming business. For example many reptiles such as Anthill pythons (*Liasis perthensis*) are worth up to ten thousand dollars (U.S. 1987). Contrary to popular belief there is much more money to be made out of smuggling reptiles than birds. Smuggling frogs out of Australia is rare.

There is little smuggling of wildlife into Australia from elsewhere, nor does there appear to be any major demand for it.

The practice of smuggling is extremely cruel in

Photo 8. Desert death adder *Acanthophis pyrrhus* copulating. The author is the only person to date who has had any success in breeding this species. In serious decline due to destruction of its spinifex habitat through overgrazing of cattle and feral camels.

Photo 9. Desert death adder *Acanthophis pyrrhus* male (head).

all aspects.

1. It can involve corruption in several countries.
2. Smugglers often source their reptiles from genuine breeders, by breaking into their facilities and steeling whatever is required.
3. The reptiles are X-rayed to 'invisibly' sterilize it, thereby preventing captive breeding by purchaser/s, and preserving exorbitant market prices.
4. In order to maintain market prices smugglers will do everything within their power to prevent captive breeding anywhere, and they benefit by reptiles becoming rarer both in the wild and in captivity.

Therefore wildlife smuggling in its current form must be stopped. Banning smuggling, and increasing fines and penalties does not work. It only serves to increase corruption and make everything else associated worse. Therefore the only way to stop the illegal export of reptiles is to legalise it. The Australian reptiles that command high prices overseas are not often 'rare' or 'endangered' species. They tend merely to be larger species such as pythons, monitors, large skinks, etc. By allowing moderate numbers of these to leave the country will not harm local populations in any way. However it will stop all the unsavoury aspects of current smuggling racket/s, by undermining the whole operation. Legalised export of reptiles would also indirectly strengthen conservation efforts of genuinely rare and endangered species in a number of ways.

Assuming that most indigenous reptiles are 'Deprotected' it would be harder for smugglers to get details of 'who has what' anyway, making all stages of the export operation hopefully more trouble than it would be worth.

Importantly the 'legal' export of wildlife should have a few important 'regulations'. Knowing that wildlife exporting is prone to corruption, legisla-

tion should be as 'corruption resistant' as possible.
All known 'de-protected' species should be allowed to be exported. No individual or 'Proxy' should be permitted to export/import more than a certain number of specimens in order to prevent large scale traders and more corruption and cruelty emerging.
A duty of around $ 300 (1987.....indexed) per specimen should be imposed. (When people have to pay something relatively substantial for a given reptile, it can be fairly safely assured that they will take proper care of it. Such cannot be guaranteed if prices are 'too cheap'). Australia should not supply the 'disposeable' reptile pet market by allowing totally unrestricted export of reptiles. (Tortoises from north Africa and elsewhere were virtually wiped out in the wild when millions were sold in the USA and Europe for ridiculously cheap prices, which encouraged people to buy them, and not take proper care of them, resulting in rapid death).
A 'Tarif' means of regulating exports has several advantages over a strict 'permit' system including:

1. Less paperwork and red tape.
2. Revenu raised for Australia that would not otherwise be raised. It should be channelled into herpetological projects only (so as to prevent later governments trying to use reptile exports as an 'economic' activity).

Corruption within National Parks and Wildlife Services (real or perceived), is seen by many as a major problem. Without doubt current policies of Australian fauna authorities are assisting wildlife smuggling rackets (possibly inadvertantly). By scrapping most current herptile 'protective' legislation and bringing in the changes suggested in the previous section, problems of potential corruption will be reduced. The importance of

Foto 10. *Pelamis platurus*, Sydney, N.S.W. Foto: Raymond T. Hoser.

Photo 10. Yellow bellied sea snake *Pelamis platurus*. From Sydney, NSW. Despite the various restrictions on keeping live reptiles (legal and otherwise), up to 40,000 sea snake skins are exported from Australia each year. Most species biology, population statuses, etc., are hardly known.

having corruption free and honest fauna authorities for reptile and frog protection cannot be underestimated.
In order to further reduce risks of corruption within state wildlife authorities, they should be where possible be broken into smaller, more effective units, or departments, (see references).

CONCLUSIONS

As this paper consists essentially of a personal viewpoint, it is hard to draw 'hard and fast' conclusions. However nobody would doubt that herpetology and conservation in general, will in future become more closely linked. At this point in time, both herpetology within Australia, and the local conservation movement need all the support that they can get. Stopping corruption within Australian fauna authorities is also of top priority.

ACKNOWLEDGMENTS

Many people have assisted me over the years in my fight against NPWS corruption and smuggling, and for reptile conservation. These include many press journalists, journal editors, lawyers, friends and colleagues. However most thanks are due to my parents, Len and Katrina Hoser who supported me during the darkest times of NPWS and 'mafia' harassment.

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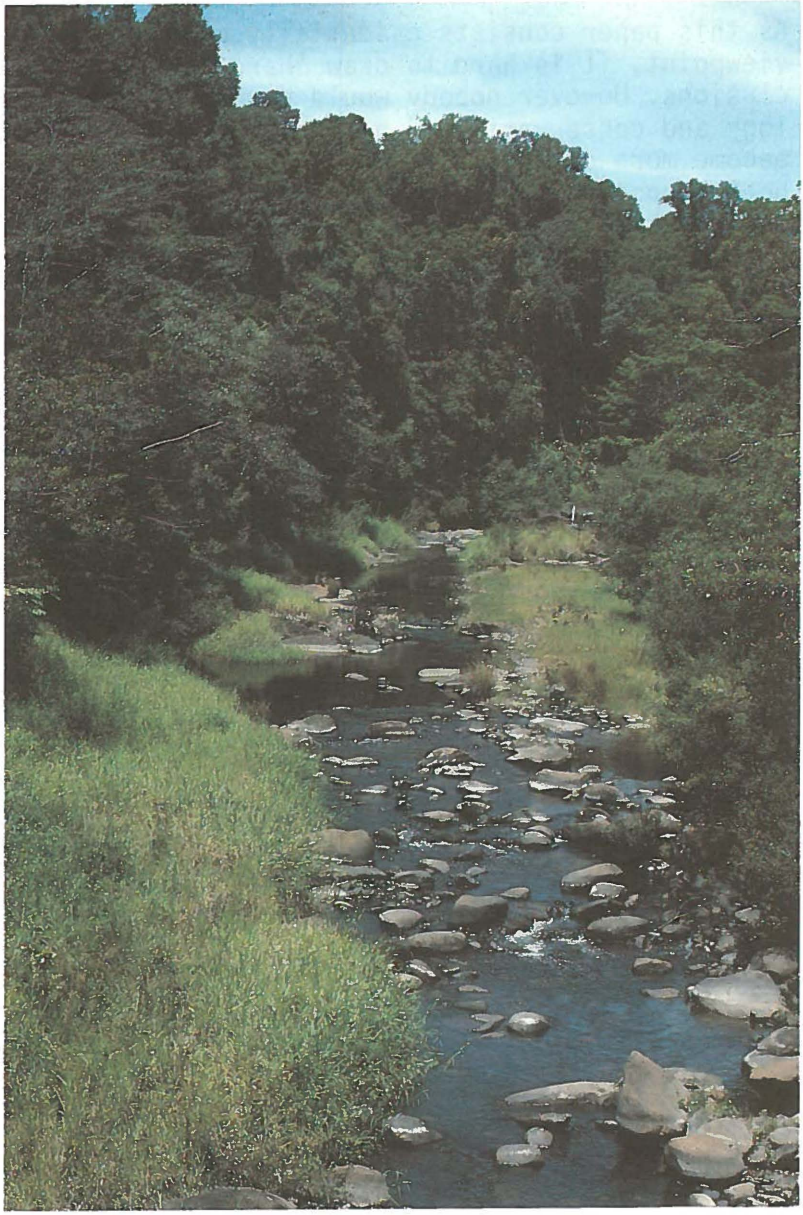

Foto 11. Rainforest watercourse, Milla Milla, Queensland. Foto: Raymond T. Hoser.

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Photo 11. Rainforest watercourse, Milla Milla, QLD. Rainforests throughout Australia are seriously threatened by logging and agricultural interests. Fortunately the local environment movements are fighting the governments of Australia to preserve this most important reptile (and other organisms) habitat.

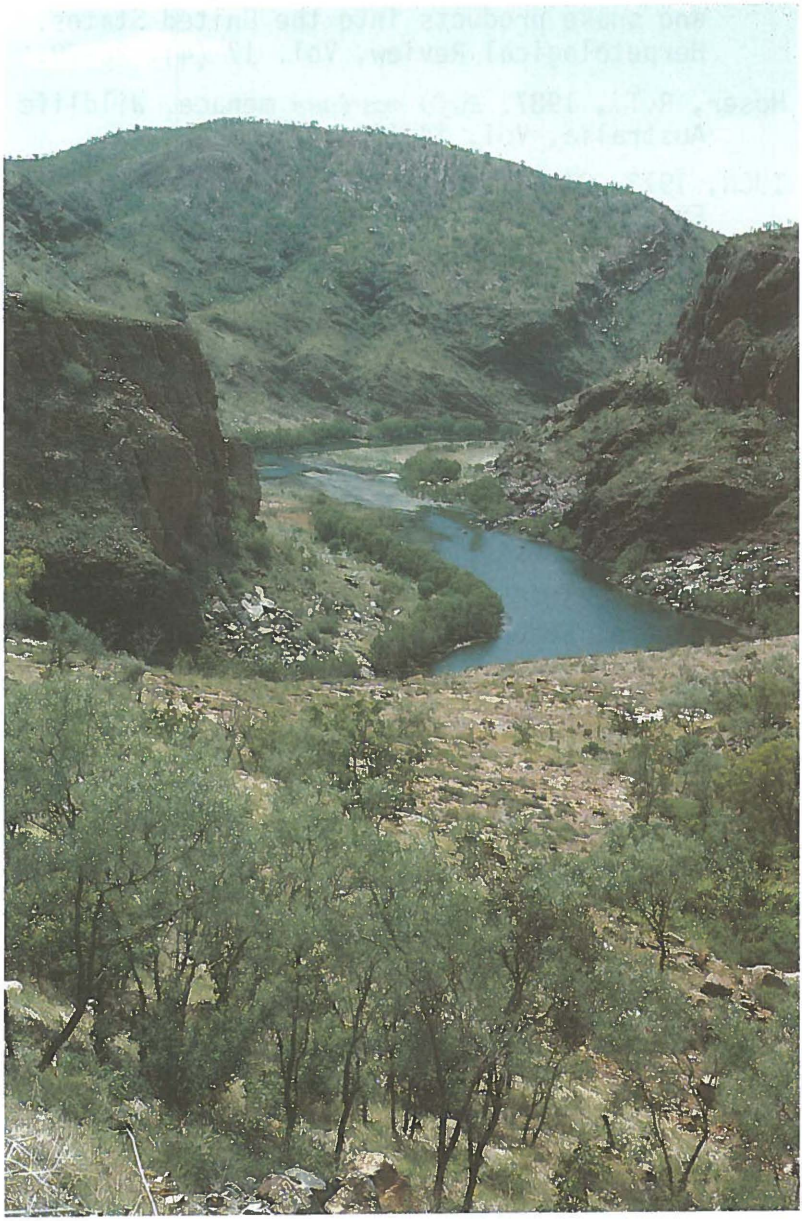

Foto 12. Ord River Valley, Kimberley Ranges, northwest W.A. Foto: Raymond T. Hoser.

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Photo 12. Ord River Valley, Kimberley Ranges, North West, W.A. This area is of vital importance, and is only relatively intact due to its remoteness and relative aridity. Overgrazing of cattle threatens the spinifex (*Triodia*) grasses which cover the rocky hills. Removal of spinifex grasses from large tracts of Australia simultaneously eliminates most reptiles at the same time.

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