Our wildlife is not safe in the bush

The rush to relevance of captive breeding

UNFINISHED DRAFT

Greg Miles, August 2011

Introduction

ABC, July 29, 2009: *"Scientists sound Oceania extinction warning"*

Many scientists believe we are now living in the midst of another big extinction event although this time the cause of the mass die-off is easier to identify - humans.

Dr Richard Kingsford is lead author on the collaborative review of thousands of research papers on conservation in the Oceania region. "The rates are increasing," Dr Kingsford said. "They are certainly a lot higher than the background rates of extinction that you would see in the evolutionary record. "Maybe 1,000 to perhaps 10,000 times that rate and that is occurring right across all organisms.

The protection of our nation's flora and fauna is in a desperate state. Numerous recent media items combine to paint a chilling picture in all regions of Australia. Despite the best efforts of Government and private conservation agencies, the situation with our wildlife could not be much worse - as the boxed news clip above testifies.

Of all that has been said and written on the topic of wildlife conservation in Australia, there is one potent opportunity that has been ignored. This opportunity is captive breeding in the private sector. In Australia today there resides an army of enthusiastic and knowledgeable Wildlife Keepers who are keen to keep and breed a wide range of Australia's native birds, mammals, reptiles, frogs and fishes. This army (estimated to be near 70,000 people) is becoming restless due to the regulatory strangulation of the various State and Territory Government conservation agencies which preside over this sector with an iron fist. There seems to be a universal bureaucratic distaste for the prospect that breeding native animals may become a 'commercial' activity for some individuals. And yet, even as the aspirations of these people's desires are frustrated by red tape and outdated laws and policies, wildlife conservation at the Government level in Australia is in serious trouble. (See **Our National Parks and Reserves Estate on page 6 below)** With the exception of a few winners such as Mudlarks, Saltwater crocodiles, Silver Gulls and Galahs, things are rapidly getting worse for most of this country's ecological communities and the plant and animal species which live within. This gloomy forecast can only deteriorate if global weather forecasters are correct in their projections. It is my view that the role of the private Wildlife Keeper can (at little or no cost to the taxpayer) be added as a potent new string to the conservation bow. Instead of being seen as part of the problem, an army of

Wildlife Keepers want to, and should be, part of the solution. It may be the only hope some species have.

With so many animals facing inevitable extinction, captive breeding should be a valuable "preservation" or "anti-extinction strategy". A recent report; *Trends in Ecology and Evolution,* has shown, for instance, that at least 16 birds from 5 continents would have gone extinct between 1994 and 2004 if not for direct conservation action.

What this essay proposes is nothing less that a major reworking of the national regime which regulates the keeping of native Australian wildlife in zoos, wildlife parks, the pet industry and amongst the many individual keepers. This proposal is propelled by the dire and urgent need of radical new action to save much of our wildlife from inevitable extinction. All around the world (and Australia is no exception) wildlife is in accelerating decline and urgent and novel action is needed if we are to minimise a new wave of extinctions.

Background to the keeping of wildlife by private individuals

The current suite of state and territory laws governing the keeping of wildlife by private individuals was promulgated back in the late 1960's and early 1970's. Prior to this time it was generally possible for anybody to keep any native animal. Many of Australia's leading conservationists began their careers by keeping and studying wildlife. These include names such as Eric Worrell, David Flea, Fredrick Wood-Jones and Sir Edward Halstrom being amongst them. As is often the case, the situation swung from one extreme to the other. The new, all conquering laws of the various states were so strict that suddenly even children could be prosecuted for keeping a bluetongue lizard if they did not have a permit – and the getting of a permit for them was almost impossible. The overriding view of the Governmental policy makers at that time was that animals should be left in the bush where they were safe. The keeping of them by individuals has always been viewed as an annoyance and a possible precursor to illegal activities. In those days there was some justification for that ideology, as animals were generally safe in the bush. Any removal of animals from the bush was regarded as potentially damaging for wild populations. Conversely, the animal husbandry skills and knowledge base of home based Wildlife Keepers was rudimentary - especially in the area of reptiles and amphibians. In those days it was normal practice to replace deceased animals with wild caught specimens. Reptiles were rarely bred in captivity. Bird keepers in the 1970's were ahead of the pack in many ways, as they already had established traditions and methodology. For this group, the breeding of birds was considered essential and was part of a respectable and rewarding hobby. Also, caring for birds is generally more straightforward than for many mammals and the cold blooded or aquatic animals. Today however, there are numerous examples of species becoming common in captivity when placed in the hands of skilled and dedicated individuals. The Naretha Bluebonnet Parrot (*Northiella haematogaste narethae)* was collected in WA in a co-operative effort between the Department of Conservation and Land Management and aviculturalists, and became a captive breeding success story. The extremely rare Rough-scaled Python (*Morelia carinata*) was collected in small numbers by John Weigel of the *Australian Reptile Park*, with permission of CALM in WA, and has proven to be easily bred, and as a result its numbers are now secure in captivity with more that 1,000 individuals being in private hands.

These are a few of many examples of what can and must be done with many species in this country. Regardless of what view you may have about captive animals, surely it is better to have a secure, genetically diverse population of threatened species in captivity, in the care of interested and ethical people, than to let them go extinct? There are many ways such captive breeding programs could be structured, but probably the biggest hurdle is the reluctance of bureaucracies to acknowledge the potential of the Wildlife Keeper community to ameliorate what is perhaps one of the most significant extinction events the world has seen, and one that is of our own making. The complexity of the task is made more so by the convoluted and varying regulations and policies each state has developed to 'protect' its wildlife. Some of the constraints placed on Wildlife Keepers are ridiculous. Reluctance to examine different ways to involve the community in these sound and reasonable pursuits is, apparently, turning the very departments charged with conservation of our native animals into agents of extinction themselves.

So what has changed? :- It must be noted that some elements of our national wildlife laws have served us well in the past. In particular the blanket ban on importing exotic animals for private use has been beneficial. In the USA today the various states have to introduce unpopular laws to put a stop to private ownership of animals such as Chimps, tigers, zebras, leopards and rare or endangered species from foreign countries.

Although the Australian state and territory wildlife laws have been adjusted in the past 3 decades, they have fallen way behind in the face of the Australian situation of today. At present there is an urgent, yet largely unrecognized need, for national policy makers to review their approach to wildlife conservation in the light of new and emerging threats, including global warming. At the present time, right around Australia, it would be difficult to make the case that native animals are safe in the bush. In fact, in many places, with many species, the very opposite is the case. Many of Australia's native animals are now 'at risk' in the bush. One need only read the Federal Governments own web site to learn this. The Federal Dept of Environment and Heritage states that, in terms of bushland:

- 2891 threatened ecosystems and other ecological communities are identified across Australia.
- 94% of bioregions in Australia have one or more threatened ecosystems, with the greatest numbers in the highly cleared regions of southern and eastern Australia.
- Nearly half of the threatened ecosystems are eucalypt forest and woodlands with shrubby or grassy understory that have been extensively cleared.

On the other hand, in the past 30 years or so, native animal husbandry skills and knowledge has increased exponentially. So too has the ability of the back-yard Wildlife Keeper to breed almost any mainstream native animal (not including difficult spp. such as platypus, cassowaries, koalas and Fairy Penguins). The proliferation of glossy magazines in news agencies with titles such as *Reptiles Australia*, *Scales and Tails*, *The Australian Birdkeeper*, *the Australian Aquarium*

Magazine and so on, point to this new world of skill and knowledge. In addition, there are now numerous web sites online which deal with all matters concerning the keeping and breeding of Australian native animals. There are also many websites of retailers who sell a bewildering array of books, food, medications and other equipment needed for the good captive management of Australian native animals.

What is going wrong in the bush?

I will argue below that our national wildlife protection legislation is hopelessly out of date and at worst could be at the point of endangering animals instead of protecting them. In my view, the situation is becoming so dire that a new look at captive breeding, within the Government and non Government areas, is essential and urgent. I see a clear, untapped opportunity to lessen the otherwise, almost universal, gloomy future scenario.

The many good players in the field of wildlife conservation tend to be engaged in their differing spheres of endeavor but do not appear to be looking into each other's backyards and recognising the Big Picture. This may be because each Governmental division is now so speciallised that there is insufficient 'cross pollination' to provide them with the Big Picture. Heads down, they toil away relentlessly, doing a good job at what they do, but with no one telling them that the 'train has left the station'.

The Big Picture is made up of countless small parts. EG There has been recent media coverage of the issues surrounding facial cancer in Tassie Devils, the arrival of foxes in Tasmania, the blight of camels though much of Australia's arid lands and the scourge of mange which is killing off a large proportion of the endangered Northern and Southern Hairy Nosed Wombats. These few recent stories represent a tiny tip of the iceberg in a list of species decline and incurable environmental disease. It is possible to throw a dart at any random spot on the map of Australia and have local experts launch into a sermon detailing the destruction and decline of habitats, plants and animals at that location. A quick national round up reveals: -

In the tropical north: - the wave of Cane Toads moving from east to west is causing catastrophic declines in a wide range of native animal species. Toads are about to enter the Kimberley where their toxic impact will see the near extinction of many species and will forever shatter the image of that region of Australia being our last great environmental paradise. Even before toads arrived in the Top End of the NT, biologists were documenting the mysterious local extinctions of a broad range of small mammals and reptiles. (See Rothwell "Creatures' rush to extinction in the Top End" in The Australian 25 April 09, and "Lost From Our Landscape" Threatened Species of the Northern Territory, edited by John Woinarski et al NRETA 2007). Recently, Rothwell described Woinarski (the NT Parks and Wildlife Principal Scientist) with the following: (The Australian, April 25, 2009)

" Woinarski, a man of precise words and restrained manner who has spent much of his life studying northern landscapes and received the 2001 Eureka Prize for his work, describes the

evidence. His group's 220, long-term monitoring sites cover the Top End's most untouched regions, places where one would expect the native wildlife to be surviving fairly well. Between 1996 and 2001, he and his colleagues observed the falling away and traced the ongoing pattern, but in the following five years it was as though the native fauna population had plunged from a cliff's edge. The newest findings were "the game-stopper". They recorded an average 70 per cent drop in species numbers and an 82 per cent drop in the total of animals seen at each site. These declines were in all environment types and all family groups. Even in national parks, where protection regimes are in place, the figures were devastating. "The most recent results are extremely alarming; indeed, catastrophic," Woinarski says.

Following the toads in the Top End is the tightening grip and unstoppable expansion of Gamba Grass (see http://www.gamba.org.au/) in the savannas and *Mimosa pigra*, *Salvinia molesta* and Olive Hymenachne on the wetlands. Gamba Grass in particular, is a silent but tragic tidal wave suffocating the northern savannahs. Following close behind is its inevitable hand maiden - extreme late season fires - which are steadily turning tropical savanna forests into a grasslands monoculture comprised solely of this imported and devastating African grass.

In the arid zone: - we see the ecological devastation caused by rabbits, cats, foxes and camels Rothwell in The Australian; 25 July 09 reports Peter Latz documenting the vegetative sterilization of central Australia by wildfires fuelled by errant spinifex, reinforced by the exotic and spreading Buffel Grass.

Tropical north Queensland: - seems to be that part of Australia where Global Warming is claiming its early casualties– the Lemuroid Possum looks like being the first of our mammals to be snuffed out by Climate Change. Habitat clearance is a mortal threat to the Australian Cassowary as documented on the ABC on September 14, 2009. http://www.abc.net.au/news/stories/2009/09/14/2684631.htm Chytrid fungus is now rampant amongst and extinguishing many frog species living in higher altitudes right down the east coast of Australia.

Southern Australia:- I will not give snapshots of the situation in the south east or south west of Australia. Instead I offer this quote from the Federal Government: -

> "The highest number of threatened species occur in southern and eastern Australia, within the subregions from the southern highlands in Victoria and NSW and along the coast from Sydney to north of Brisbane."

Western Australia. In addition to what is possibly Australia's current worst environmental disaster – toads arriving in the Kimberley - the state of Western Australia also has major problems within its own nature conservation bureaucracy. See a précis of that states Auditor General's report on Page 6 or the full report at http://www.audit.wa.gov.au/reports/pdfreports/SpeciesInsert.pdf

It is notable however that, in some parts of southern Australia, more enlightened, modern attitudes, amongst farmers in particular, have resulted in some improvements for wildlife. An example being the mid-north of South Australia where some birds and macropods have made reappearances in areas where they had been hunted out in the 1960s. It is also in the farmland of SA where the extinct Pygmy Bluetongue Lizard has been rediscovered. Landcare groups and Aboriginal community Rangers schemes around Australia also have very positive impacts, but only on relatively small areas of land and affecting limited numbers of species of plants and animals. But climate change hangs like a scythe over even these small gains.

With this brief review I am attempting to paint a picture which illustrates just how parlous is the state of our ecological communities. It will be clear to all readers that the formal list of endangered and extinct species will not only grow in the future but the rate of growth will accelerate. For example in October 2008 a story reported in the ABC stated that: "*According to a major new survey nearly 800 Australian fish, birds and plant species are headed for extinction."*

At October 2009, the International Union for Nature's Red Book *"lists 269 birds, mammals, reptiles and amphibians within Australia as being Near Threatened, Conservation Dependent, Vulnerable or Endangered and Extinct in the Wild.*" Most of these are shown to have decreasing populations, with more species being added to this depressing list every year. See http://www.iucnredlist.org/ Many of these species are excellent candidates for self sustaining captive breeding amongst Wildlife Keepers if only the authorities would allow it.

Our national parks and reserves estate

Clearly our national reserves system is set up to perform the role of conserving our wildlife. "This is where our native animals should be, not in zoos or suburban back yards." Many would say. In an ideal world this would be true. Unfortunately the truth is that the wheels are falling off our parks and reserves system. If you talk candidly to almost any old timer park Ranger and ask them to assess how things are now, compared to how things were 20 years ago, the answer will be the same. "Things are going down hill." This is not the fault of the Rangers or even the Parks agencies. The problem is that our parks are dying the death of a thousand cuts. The remorseless and relentless inroads of traditional and new destructive issues, usually overwhelms the best of management efforts in our parks. This reality was amply demonstrated in a recent report by the Western Australian Auditor General when he reported on the role of the state's Department of Environment and Conservations (DEC) where it pertains to the protection and conservation of threatened species. This report, named "**RICH AND RARE: - CONSERVATION OF THREATENED SPECIES"** was published in June 2009. The content of the report was chilling, particularly since Western Australia is one of the wealthiest states in one of the world's wealthiest nations. The report began in this way:

Background

Western Australia (WA) is globally significant for its biodiversity, of both flora (plants) and fauna (animals). WA has over half of Australia's biodiversity hotspots and the South West is internationally recognized for its biodiversity. In 2008 there were 601 species listed as threatened in WA.

The Department of Environment and Conservation (DEC) is the primary agency responsible for conserving this biodiversity. DEC estimates that in 2007-08, it spent $8.2 million directly on threatened species activities, including evaluating the conservation status of species, developing and implementing recovery plans, monitoring species, and managing data. DEC has other areas of activity which influence the conservation of threatened species. For example, creating reserves protects threatened species' habitat. DEC's nature conservation programs can also address processes that pose risks to threatened species. DEC's programs to manage dieback and salinity are an example of this. These programs are not targeted at threatened species directly, but contribute to their conservation.

We focused on whether DEC is effectively protecting and recovering threatened species; whether it has clear strategies, plans, policies and procedures in place to support threatened species conservation activities, and whether those activities are conducted in line with relevant legislation, plans, policies and procedures. We included terrestrial threatened species and excluded marine species.

What the examination found...

- 601 species in WA are listed as threatened with extinction and this number is increasing. Only a handful of species are improving.
- Only one in five threatened fauna and less than half of threatened flora have a recovery plan, while full implementation of the plans that are in place often does not occur. Without a recovery plan, the needs of threatened species may not be identified and addressed.
- Multi-species approaches to conservation are an effective response to the growing number of threatened species. DEC has a number of multi-species programs.
- Creating reserves is a key habitat conservation mechanism, but less than half the amount of land agreed under the national target has been reserved in WA. On average, it takes a decade for acquired land to become a reserve.
- DEC cannot demonstrate the effectiveness of its threatened species conservation activities for all threatened species.
- Since 1987 DEC and its predecessor agencies have sought to replace the 1950 Wildlife Conservation Act with new legislation that would provide greater support for conserving biodiversity.

DEC has some successful programs to address broad scale threats to multiple species, but in other areas that underpin conservation, such as habitat protection, DEC is facing significant challenges.

DEC cannot demonstrate the overall effectiveness of its threatened species conservation activities. This limits assurance that it has effective management and conservation processes and programs to ensure the protection and recovery of WA's threatened species.

Much of DEC's threatened species activities are not enabled by existing legislation and DEC has created policies to cover these gaps. The *Wildlife Conservation Act 1950* does not provide species with adequate protection.

Examination conclusion…
In many areas DEC is not effectively protecting and recovering threatened species. The number of threatened species is rising and only a few species are improving. Recovery action is not happening for most threatened species. The majority of resources and effort are allocated to critically endangered species, placing vulnerable and endangered species at risk of further decline."

This quick look at Western Australia was done at random. It is likely that a review in all of Australia's other States and Territories will reveal a similar, depressing story. It is ironic that Western Australia also has the most draconian and restrictive laws in relation to keeping native animals as pets!

Another Government example (this time the Federal Government) is Kakadu National Park in the Northern Territory. This is Australia's largest and best funded national park. It was declared in 1979. Since that time, the natural environment of the Park and its populations of native animals in particular, have been in "catastrophic" decline. The quote by John Woinarski on page 4 above was in reference to Kakadu. Feral animals, severe wildfires, weeds, soil erosion and a complex management regime have all taken their toll over the past 30 years. The control of feral buffalo and the virulent weed *Mimosa pigra* have been big wins in this Park. The eradication of Water Hyacinth and the African Big Headed Ants are also achievements to be applauded. Sadly, at the same time, Kakadu has lost the battle against the recent arrivals of *Salvinia molesta*, Para Grass and Cane Toads. This great park will also probably loose the fight against virulent ponding pasture grass called Olive Hymenachne on its Ramsar listed wetlands. In addition, pests in parks such as Kakadu are now often largely (unintentionally) protected. In the north of the Northern Territory it is common place for pigs and other exotic mammals to enjoy a regime of institutionalized protection within national parks and conservation reserves that they do not enjoy on neighboring crown land and private property. The reasons for this are complex (often not the fault of the Park service) but have much to do with the way Government agencies are forced to operate in the modern world.

THE ROLE OF THE FEDERAL GOVERNMENT

The Federal Government regulates many aspects of the conservation of Australia's natural environment. It has very strict laws pertaining to the export of Australian wildlife. In short, only zoos and wildlife parks can export native animals. Even this comes under close scrutiny with the Dept. of Environment requiring information on the suitability of the receiving institution. There is a blanket ban on the export of wildlife (captive bred or otherwise) for commercial purposes. The reason given for this is that our animals "could end up in the windows of dodgy pet shops or into the hands of people of disreputable character". I find this extraordinary, as the Federal

Government's responsibilities lie with conservation of species, not the welfare of individual animals. There are numerous other agencies both in Australia and overseas which deal with animal welfare. In terms of conservation, any captive bred native animals should not be of any conservation concern to the Federal Government as (a) the salable babies are not coming from the wild and (b) the babies would not exist if it were not for the artificiality of the captive breeding setup. In addition, I struggle with the concept that the Australian Government is so concerned about the welfare of any animal which might be sent overseas. Surely this is the responsibility of the recipient country. How would the Australian Government feel if the scenario were reversed, with another country not sending high value things to our shores because they may not be treated well? Is this some kind of clandestine international trade barrier?! I now offer my own situation as a case study to illustrate the silliness of the EPBC and its policies:

I own and manage the world's only commercial Pig Nosed Turtle breeding facility. This species is listed as Vulnerable by the IUCN but not listed by the Australian or Northern Territory Governments. 80% of the world population of the Pig Nosed Turtle lives in PNG and Indonesia. In these two countries it is being harvested at unsustainable levels. The remaining 20% of the world population of this species lives in Australia – in a few river systems in the Northern Territory. In Australia this species is currently going through a population spurt thanks to the recent arrival of the Cane Toad. At the international level the IUCN is likely to list this species as endangered in a couple of decades. At my breeding facility I have the potential to breed more than 100 animals per year. At the present time I can produce about 20 per year and these are all sold into the Australian pet market. These are a niche species in Australia with a very small market size. Already I have had to drop the price from $1,000 per hatchling to $500 in order to maintain sales. At this price my facility is no longer financially viable. If I were allowed to export to Europe and the USA, I could once again charge $1,000 per animal. In addition, I could expand my business and employ support staff. In other words I am able to produce good numbers of potentially endangered animals and sell them legally to respectable buyers overseas. However, the EPBC does not allow this on animal welfare grounds.

I am now facing the reality of having to completely close down a successful breeding facility as it is not worth the trouble to continue with. I other words, I will cease to produce numerous potentially endangered animals because Government laws designed to protect wildlife (including endangered wildlife) will not allow it (even though the law is being applied at the animal welfare issue, not the conservation issue)!

The Draft Biodiversity Conservation Strategy Review.

The Federal Government is in the process of reviewing the Environment Protection and Biodiversity Conservation Act, (the EPBC) where it relates to Australia's Biodiversity Conservation. See http://www.environment.gov.au/biodiversity/strategy/draft-strategy.html This Howard era Act was deeply flawed to start with and has not been substantially changed since 1999. Yet, much in our bushland has changed since then. This review is propelled (at least in

part) by the growing awareness that current and historic action, programs and methods of biodiversity protection are failing. Many of our native animal and plant species are in decline despite decades of remedial effort by Federal and State Governments of all persuasions. Whilst I support the Draft strategy in principle, there are many good things contained within, I don't believe that it casts the net widely enough to include new, novel and different initiatives. Initiatives such as the robust embracing of captive breeding of threatened species in the wider community.

The draft of the strategy review says in part that things are so dire that "**Business as usual is not an option**" but then it goes on with great detail of "business as usual" - especially with new monitoring activities! This was Kakadu's formal response to the arrival of Cane Toads: "We will monitor the impact." stated the media releases. But monitoring does nothing to stem declines. This was a particularly serious in Kakadu as this Park is/was home to a range of endemic animals found no where else and which were known to be vulnerable to the impacts of toads. Nothing was done for these endemic species even though Kakadu is one of Australia's wealthiest parks and managed directly by the same Federal Government Department that is charged with national responsibilities for the protection of this country's threatened animals. The new Strategy Draft is starting to look as though the Federal Government is going to do the same as happened in Kakadu, but on a national scale. IE, - nothing much. Amongst other things, the Strategy Draft, under the heading of "**Principles underlying the development and implementation of the strategy"** states that **"Biodiversity is best conserved in its natural state."** And **"We should apply the precautionary approach to biodiversity conservation."** Yet these two statements are mutually incompatible. The whole reason for this review is because conserving biodiversity **"in its natural state"** is failing (and the failings are accelerating). This was recently the subject of a 60 minutes story, demonstrating that even the media are becoming aware of this little know reality. See http://sixtyminutes.ninemsn.com.au/article.aspx?id=1075026

Clearly - like never before - radical and unusual methods are desperately needed, in addition to traditional methods. What I am proposing in this essay is desperate action for desperate times and far removed from the orbit of the **"Precautionary Approach".** I have heard it said in the Parks world (not NT in this case) that, in recognising the precautionary approach, applications to take animals from a park or reserve should only be allowed in extreme circumstances and that people should always seek animals from outside of parks and reserves. I would argue that it precisely because of the Precautionary Principle that permits should be issued for Parks and reserves, and with generosity. This is because parks and reserves are a good gene pool to help create and sustain captive breeding colonies. Without these colonies many of the animals in question in the parks and reserve may disappear totally. Maybe it is time to introduce the radical idea that national parks should become a preferred source for the breeding stock and on-going genetic infusion of native animals.

Case studies within the draft of the Biodiversity Conservation Strategy review.

On page 45 of the Strategy draft is case study 11: Park monitoring (Northern Territory Government) **"**The establishment of national parks or other conservation reserves is a critical component of biodiversity conservation; however, establishment alone does not provide for conservation security. To deliver good conservation outcomes for national parks, we need to know what biodiversity exists in parks, how it is faring, and how it should best be managed. To these ends, a comprehensive and integrated biodiversity monitoring program has been developed across three large national parks: Kakadu, Litchfield and Nitmiluk. This robust and integrated monitoring program is fundamental in the joint management of these parks, all of which are situated in the Top End of the Northern Territory. The program is based on agreed commitments and management planning that stipulate the maintenance of biodiversity and, in the case of Kakadu, an obligation under World Heritage agreements to maintain heritage values. Without detailed monitoring it is not possible to measure performance towards such commitments, or to improve management in the face of threats, particularly fire and climate change. This program uses a large series of permanent plots (133 in Kakadu, 41 in Litchfield and 46 in Nitmiluk), in which vegetation and vertebrate fauna are systematically monitored at five-year intervals. The monitoring program is aimed at the assessment of impacts of fire regimes and management, because fire is a particularly important process in this region. For each plot, a detailed fire history is recorded and used to inform changes in vegetation or fauna over successive monitoring periods. Sampling of the plots is a collaborative and challenging exercise. Park rangers and Indigenous traditional owners work on the monitoring with biologists and managers from the Northern Territory Department of Natural Resources, Environment, the Arts and Sport, and Parks Australia (Australian Government). In the 15 years since its establishment, the monitoring program has provided clear information showing decline in some fire-sensitive heath lands, localised expansion of some rainforest patches, increases and decreases in forest stand basal areas dependent upon fire history, region-wide increases and decreases in some plant species, and overall decline in native mammal fauna in part related to fire history. These results are regularly reported back to park managers and serve to re-direct park management priorities and practice. Measuring performance, particularly on this scale, provides invaluable information about ecological responses to park management practices. For more information see www.nt.gov.au/nreta/wildlife."

All of the above sounds wonderful – on the surface anyway. This however, is a very poor case study to use. I have a very detailed knowledge of Kakadu, having been a Chief District Ranger there for 20 years and a further 10 years as the Kakadu Park Naturalist (amongst other roles). Whilst I salute the essential and great monitoring work of the biologists led by John Woinarski, it is not possible to flag "Park Monitoring" as any form of biodiversity conservation action. What park monitoring has done, is identify and highlight the plight of native animals in the region. It is a bit too convenient to then say that information supplied *"to park managers will serve to re-direct park management priorities and practice."* In fact nobody knows why so many animals

are disappearing from that region. If the cause is not known then Park Managers can hardly "*redirect park priorities and practice*." It is easy to point an accusatory finger at wildfires for species loss. But history has shown that changes in annual fire outcomes on a landscape scale are stubbornly difficult to achieve. Despite the best efforts of well equipped and experienced Rangers and local Aboriginal people, severely destructive fires continue to sterilize much of Kakadu and west Arnhemland every year. Such fires are burning as I write this on October 25, 2009 – probably the worst time of year for fires to be burning. Another example that points to the redundancy of the above case study is that of the Cane Toad. Kakadu knew about the devastating impact that this species was threatening for a year or two before the first toad was found in the Park. (See http://www.environment.gov.au/ssd/publications/ssr/pubs/ssr164.pdf) In light of this knowledge, did Kakadu *"re-direct park management priorities and practice"* in any meaningful way to counteract Cane Toads? No it did not, could not. The best it could do was to foster monitoring – which - as we all know does nothing in or of itself to protect biodiversity. In 2001, the University of Sydney installed about 5 Cane Toad Listening Poles. These are automated devices which log the calls of all Kakadu frog species as well as the toad. They were installed several years before the arrival of toads and have now been working for a number of years since the toad front passed through. The purpose of these devices is to monitor the toads impact on native frogs. I would be prepared to wager that Kakadu's senior management have little or no interest in the results of this monitoring.

In stark contrast to the manner in which "Park Monitoring" has been presented in the Draft, monitoring has primarily shown that current park management priorities and practices (as they relate to biodiversity conservation) in Kakadu are failing spectacularly and have done so within the time frame that the Park has been managed by the Federal Government. What is happening in Kakadu is a strong argument supporting the importance of the role that the community could play in terms of captive breeding of threatened species – especially those endemic species which reside only in Kakadu and are clearly at high risk of extinction if they are left in the wild to fend for themselves in this World Heritage Park. The Oenpelli Python being a blindingly obvious example. It is noteworthy that this is written in the shadow of John Woinarski's research. Here is the Abstract from one of his recent papers named "**The disappearing mammal fauna of northern Australia: context, cause, and response**.": -

Abstract

This article provides a context to, attempts an explanation for, and proposes a response to the recent demonstration of rapid and severe decline of the native mammal fauna of Kakadu National Park. This decline is consistent with, but might be more accentuated than, declines reported elsewhere in northern Australia; however, such a comparison is constrained by the sparse information base across this region. Disconcertingly, the decline has similarities with the earlier phase of mammal extinctions that occurred elsewhere in Australia. We considered four proximate factors (individually or interactively) that might be driving the observed decline: habitat change, predation (by feral cats),

poisoning (by invading cane toads), and novel disease. No single factor readily explains the current decline. The current rapid decline of mammals in Kakadu National Park and northern Australia suggests that the fate of biodiversity globally might be even bleaker than evident in recent reviews, and that the establishment of conservation reserves alone is insufficient to maintain biodiversity. This latter conclusion is not new; but the results reported here further stress the need to manage reserves far more intensively, purposefully, and effectively, and to audit regularly their biodiversity conservation performance.

It is ~~understandable~~ that Dr Woinarski's mind does not easily go to the idea of captive breeding as an insurance strategy. ~~His life's work has been dedicated the wildlife studies at the landscape scale.~~ He does not object to such a measure, but his mind is focused at the landscape scale (Woinarski pers comms)

Case study 5: Corroboree Frog breeding program (Australian Capital Territory Government) A captive breeding and monitoring program has commenced at Tidbinbilla Nature Reserve for the northern corroboree frog (*Pseudophryne pengilleyi*). The objective of the program is to maintain a captive colony of northern corroboree frogs as an insurance against extinction in the wild, with the ultimate aim of breeding the species for release to re-establish wild populations.

Strangely the opening paragraph of the case study above gives the green light to the captive breeding ideology. Why then does the Government fail to see the blindingly obvious potential of captive breeding at a public level? Particularly since other parts of this draft stresses the crucial need for the public to be engaged in conservation efforts at every level.

I will now offer my own case study at the state level:

A Tale of two pythons, the Oenpelli Python and the Rough Scaled Python.

Both of these reclusive snakes have tiny distributions within Australia. The Oenpelli is found only in the sandstone ramparts of the west Arnhemland and Kakadu sandstone escarpment in the north of the Northern territory. The Rough Scale Python (a type of Carpet Snake) is restricted to some deep chasms in the north Kimberley of Western Australia.

Probably the rarest snake in Australia, the Rough-scaled Python, is only known from around ten snakes captured in the wild. The Australian Reptile Park has developed a major research and captive breeding program for this species with assistance from the Western Australian conservation department, CALM. Numerous trips have been made to the snake's natural range to study it in the field and collect specimens, the only ones currently in captivity anywhere in the world. Just reaching the study site is a major operation requiring the use of domestic airliners, light aircraft, helicopters and boats transporting everything that would be required to survive in this remotest area of Australia for several weeks at a time. The Rough-scaled Python has one of the smallest distributions of any snake. At this stage, virtually nothing is known of its biology but it appears to spend its time in the tops of trees or in sandstone caves and crevices becoming

active at night in search of prey. The Australian Reptile Park succeeded in breeding this species in captivity for the first time in January 2001. Since that time a few other breeders have subsequently bred this snake from those original individuals. Today there are more than 1,000 individual captive bred snakes in private hands – and more eggs are incubating. This is clearly a captive breeding success story. It is not known what the future holds for this species in the wild as Cane Toads, changed fire regimes and climate change take their inexorable toll on the Kimberley's fabulous but imperiled landscape.

Back in the NT, the fight continues over the future of the charismatic and enigmatic Oenpelli Python. This species (Australia's second largest python) is listed as Vulnerable by the NT Parks and Wildlife Commission. In their own web site they note that little is known about the abundance and population dynamics of this species in the wild. They also note that there are reports suggesting that numbers are declining. This would not be surprising as many other animals in the same region are in steep decline with some, such as the Northern Quoll (which would be a food animal for the python) and the large Arnhemland Egernia, becoming locally extinct. In terms of the Oenpelli Python's conservation, the NT Government offers the following Status Report on its web site where is says in part -

Conservation objectives and management

Research priorities are to:

(i) examine the impacts of fire regimes upon the Oenpelli python directly, or its preferred prey species;

(ii) attempt to derive some estimate of relative abundance, habitat associations and total population size;

(iii) collate, where appropriate, traditional ecological knowledge of this species held by Aboriginal landowners in the stone country.

Management priorities are to:

(i) establish a monitoring program for this species, particularly with reference to its response to fire management;

(ii) continue to deter illicit reptile collectors.

A small captive population of this species has been maintained at the Territory Wildlife Park.

Whilst these are all good words they do not progress the survival prospects of the species very far. I am loath to be critical of Parks and Wildlife NT and its staff but it is worth examining the above dot points in more detail to test their veracity.

Point 1, *examine the impacts of fire regimes upon the Oenpelli python directly, or its preferred prey species*. In reality this would be excruciatingly difficult and expensive to do, mainly because the snake is so difficult to find that it would be (in a practical sense) impossible to get a sufficient data set to make any evaluation of fire impacts impossible. In terms of fire impacts on its prey species, this would be tricky as we don't really know what its preferred natural food is. It is likely to be bats, possums sandstone rats and quolls as well as rock wallabies. It would be extremely difficult to establish what impact fire is having on these species for much the same reason.

Point 2, *attempt to derive some estimate of relative abundance, habitat associations and total population size.* This too would be virtually impossible (and hugely expensive) as we are

unaware of its total distribution and therefore unlikely ever to know its total population. This animal lives exclusively in some of the most difficult and remote landscapes in Australia. It would take a massive operation of the size normally reserved for the military to be able to search this region in sufficient detail to find the limits to the snake's distribution or a feel for its total population size.

Point 3, *collate, where appropriate, traditional ecological knowledge of this species held by Aboriginal landowners in the stone country.* Whilst this would be a good thing to do, there are many problems with it. Not the least being that past experience has shown me that traditional ecological knowledge is not often of much use in managing a species. Particularly a species as reclusive as this. Most of the Aboriginal people of the region packed up and left the primary habitat of the Oenpelli Python at least 40 years ago. Traditional indigenous knowledge of the sandstone environment is being - has been - lost at a spectacular rate. Increasingly few living Aboriginal people in the region would be able to identify a Nawaran (as they call the Oenpelli Python). In any event, much traditional knowledge of animals like this falls into two main categories (1) the mythological and (2) the culinary. In my experience it is very difficult to marry mythological knowledge in to practical conservation strategies and (2) the culinary knowledge is primarily centered around catching, killing and cooking. Here again, apart from the catching bit, these knowledge sets are tricky to build into any form of conservation strategy. This is doubly so in the case of the Nawaran as the people of this region see no distinction between the small and abundant Childrens Python and large and rare Oenpelli Python. Both are called Nawaran in their language.

Under "Management Priorities" Parks and Wildlife offer the following:

> *(i) establish a monitoring program for this species, particularly with reference to its response to fire management*; It is not known to this writer how one can establish a monitoring program for a ghost. This animal is so infrequently seen that a monitoring program is, for all intents and purposes - impossible. What could be done (but is not suggested) is to radio track a few individual snakes. Data arising from such an exercise would give biologist a 'feel' for how difficult this species is to find in the wild. The behavior of a few radio tracked individuals could give a useful baseline for extrapolation and thus a clue to whether or not this species is common but very reclusive or, relatively easy to find but evidently very rare. Certainly there is no hint that such work is going to occur. It could also serve to 'train' the biologists in how to look for and find this snake in its preferred habitat.
>
> *(ii) continue to deter illicit reptile collectors*. There is not much problem in this regard. 99.9% of the known habitat of this species is totally inaccessible to all but those people who can afford a helicopter. We also know that there are very, very few anywhere in captivity in Australia. The few individuals at the NT Territory Wildlife Park are tired old non-breeders. Despite numerous efforts, the Territory Wildlife Park (an arm of the NT Parks and Wildlife Commission) has never been able to collect any specimens from the wild. Ironically back in the mid 1970s when this species was first discovered by non Aborigines, a few were smuggled to Germany. These were bred successfully and now Oenpelli Pythons are found in exclusive collections in Europe, the USA and Canada. There are now more captive specimens of this species overseas than in Australia – Australia a country which formally lists the species as Vulnerable and possibly in decline. If this species goes the way of the giant Arnhem Land

Egernia and becomes extinct in this (its home country) we may well be grateful for the boldness of the animal trafficker who smuggled those early specimens out to Europe.
This animal could well be on the slippery slope to extinction - nobody knows. For several years now a prominent Darwin based python breeder has been trying to obtain the necessary permits to collect this species for captive breeding in a similar way to that done by the Australian Wildlife Park with the Rough Scale Python. Despite an immaculate reputation at breeding pythons, he has, at every turn been frustrated in this endeavour. It seems that (unluckily for it) this snake lives in a part of Australia that is managed by numerous complex organisations. Uniquely and paradoxically, the total world distribution of the Oenpelli Python is wholly contained within Kakadu National Park and western Arnhemland. Both are places which offer high levels of environmental protection to the land. In fact, in September 2009, Australia's national reserve system, grew by two million hectares after a Federal Government declaration of two huge tracts of Arnhem Land (east of Kakadu National Park in the Northern Territory) as Indigenous protected areas. Together with Kakadu this protected area wholly contains the world distribution of the Oenpelli Python. It is all Aboriginal land and to gain the new declaration, the owners have entered into a voluntary agreement to promote biodiversity and conserve cultural resource in line with international standards. This would suggest that the conservation status of the python is secure. Sadly this is not the case due to dramatic and destructive changes unfolding in the region as stated by one of the senior Aboriginal Land Owners, Dean Yimarbuk, when he said: "There's a lot of things happening up here that are damaging the landscape. We just need a lot of people to come and join in." Clearly, there can be no more blindingly obvious case for a captive breeding exercise to occur.

Finally, and as a minor footnote, the Parks and Wildlife status report on the Oenpelli Python says, *A small captive population of this species has been maintained at the Territory Wildlife Park.* It is telling that past tense was used in this sentence. The few animals that the Territory Wildlife Park has are non breeding and never will breed without a fertile male. No such animal is forthcoming and the existing females will probably die of old age before getting a chance to have eggs of their own. I find it extraordinary that the Status Report did not recommend a captive breeding program. This could be set up, with a high likely hood of success, at a tiny fraction of the cost of the other vague and unachievable recommendations in the report.

The role of state Governments

Paradoxically, in this era of a growing list of rare animals and plants, the various state Government departments seem to be making it more difficult to breed native animals in captivity rather than easier. The reason very often given is that people should not take vulnerable, threatened, rare or endangered animals from the wild <u>because</u> they are vulnerable, threatened, rare or endangered. However, in many cases, these are the very reasons why such animals <u>should</u> be taken into captivity! Government agencies the world over seem to have the habit of allowing a plant or animal to become Critically Endangered before doing a knee jerk, panic attempt at captive breeding at considerable cost to the tax payer. What they <u>should</u> be doing is fostering animals in to the hands of experienced Wildlife Keepers long before they get anywhere near the Endangered list. Wildlife Keepers will breed up many native animals at no cost to the

taxpayer. Then, by on-selling to other Keepers, the total number of animals in captivity expands and the species (like the Rough Scaled Python and many others) becomes secure in captivity. Then, from time to time, the Government agency should facilitate the capture of additional breeding stock to infuse new genetic material into the captive bred population. All of this can be done at low cost to the Government agency and thus the taxpayer.

But Government agencies seem to be bogged down in redundant ideologies. They do not seem to understand what is happening in the modern, natural world. There are many reasons for this which I will examine below:

1. In the area of protection of Australian wildlife, public servants are required to follow legislation which, I argue, is out-dated and does not recognize the new reality in the bush. Many of these laws are inadequate or even counterproductive for the task that they are intended to perform.
2. It is the way they have always done things. Change is slow and painful in the Public Service.
3. Government agencies seem to believe that only they have some sort of 'divine' right to own and control wildlife. They seem to be unaware that much of Australia's wildlife knowledge was gained from captive animal colonies.
4. There appears to be a disconnect between the various divisions of the public servants who work within the conservation agencies. EG it appears in some cases that the people who administer the permit regime are largely isolated from related divisions such as the fauna survey scientists. Permits people are more likely to be in contact with law enforcement staff than with the biologists. Yet it is the biologists who are more likely to know what is happening with wildlife in the real world. The enforcement wing of any parks and wildlife organisation often tends to have a narrow policing focus, trained on catching people doing the wrong thing. In common with the enforcement people, the permit staff are duty bound to follow the letter of the legislation and Departmental policies which may have been written decades ago and be redundant or even counterproductive. These elements tend to make the administration of the wildlife permits regime, robotic and locked into the 'black letter' of the governing rules. It also puts a heavy burden on the departmental executives who preside over and juggle all the divisions within the agency. These executives on the one hand must implement the aging, standing legislation whilst on the other, try to keep up with new conservation realities and ideals. New and crucial information coming from the biologists may be drifting further and further into conflict with the legislation. The field biologists however, do have a good sense of what is going on in the bush. They are aware of the population dynamics of individual species and the threatening processes attacking them. But the Duty Statements of these biologists are unlikely to extend to developing creative ideas in conservation methodology or any conversation with the people in the permits or law enforcement sections. Now that the current crop of wildlife protection laws are (at their core) more than 30 years old one can

assume that few of the younger people working in the Government areas of wildlife conservation are keepers of wildlife. This deficiency/trend may be in part a product of their own legislation (not of their own making) which has largely alienated young people from the opportunity to keep wildlife as pets. A logical consequence of uncoupling children from the joy of keeping native animals would be a resulting emotional distancing of young adults from native animals and the natural environment. Flannery in his book The Future Eaters states: *"A few generations ago a large proportion of young Australians kept indigenous species for pets and lived in semi-rural or rural areas. From my own 1950's childhood, I vividly remember a family friend's pet magpie and my grandmother's cockatoo. I myself kept goannas, snakes, blue-tongue lizards and a wide variety of frogs. Great benefits in terms of familiarity and fondness for wildlife developed from such interactions. Today, many such interactions are illegal, unless specifically licensed by the relevant government authority. Even where they remain legal, there is a general community perception that it is somehow wrong to have native animals as pets.*

This great legal fence that divides ordinary Australians from their fauna is, I believe highly destructive. Today, many young Australians may like their fauna, but few understand it as their grandparents did. Unfortunately, continued urbanisation and urban consolidation is forcing further alienation of people from their environment. Urban consolidation is removing bushland and even gardens from much of our immediate habitat. These areas give most young Australians their first chance to learn about their environment. As the larger trees, lizards, frogs and birds gradually vanish from the urban areas, the alienation of the great majority of Australians from their land will be complete."

Administration of this new system

How do the various state P&W depts. monitor this explosion (as I am proposing) of people keeping so many spp.? Partly by streamlining the existing system. An immense amount of time is lost, wasted by the permits sections annually reissuing permits for people or organisations, such as schools and universities, to possess skins, skulls or mounted specimens of native animals. Whilst I can see the need to prevent the uncontrolled exploitation of parts of animals such as kangaroo meat, possum skins or birds eggs, there is something seriously wrong with a system that requires - a school for instance - to reapply each year to keep a bandicoot skull in the biology classroom. In addition, time is lost doing annual reissues of permits for people who have a single protected animal as a family pet.

In addition, thought needs to be given to de-listing a whole range of native animals which need not appear on the Parks &Wildlife books. I suggest that it may be possible that a wide range of common and/or easy to keep species can be (caught?) kept, bred and traded without any permits

at all. This will be the "Beginners and Kids List" and regulation of it will basically be at an animal welfare issue as with all domestic pets. Animal welfare issues need be considered here as we do not want any native animal (or any animal for that matter) to fall into the hands of people who are not committed to the appropriate care of that animal.

The permit regime of every state and Territory Park Service is set up to protect wildlife from threat – and ultimately from extinction. This should not be confused with protecting individual animals from harm. This is the role of animal welfare agencies such as the RSPCA. State and Territory P & W Services do not have the resources to deal with this. If they attempt this role, then we would expect to see a diminution of their effectiveness in protecting species in favour of protecting individuals. In other words, common native animals which are not in need of conservation protection should not be a primary responsibility of the Government agencies charged with the protection of landscapes and species. This angle has been taken one step further in WA where that states P & W Service was criticized by its own Auditor General who found that spending limited time and money on the protection of Critically Endangered species was taking resources away from much more viable conservation of less threatened species. (See pages 6 and 7 above). I would argue that many of the critically endangered species would flourish in the hands of experienced wildlife keepers at little expense to the state Government.

How would the record books be maintained? This issue could be addressed in part at least by the internet. There is a need for a national Wildlife Keepers web site. At an overarching level, this could be run by the Federal Government. Within this site would be the appropriate home pages of all the state and Territory wildlife agencies. In turn, their sites would carry all of the necessary information and links that would be needed by people who keep native animals:

eg such as

- where people can board their animals when they go away on holidays.
- giving notice that an animal is unwanted and arranging for others to take it on.
- Care sheets for all native animals
- Contacts for all Australian native animal vets.
- Application and movement license forms
- Contacts of specialist keepers and collections within the zoos and wildlife parks as well as top shelf private keepers.
- Contacts of academics, universities and museums involved in this field.
- Lists of NGO Land care groups who wish to interact with people who keep animals suitable for reintroductions.
- A virtual library of keepers publications and well as academic articles and works from land care organisations such as the Australian Wildlife Conservancy, Birds Australia, Bush Heritage etc

- An excursions board where commercial wildlife NGOs such a zoos can advertise club excursion discount offers or out back tour offer s from bird watching or mammal spotlighting tours around Australia.
- The potential list is endless and the site/s could be fuelled by advertising from pet shops, vet centers and zoos and wildlife parks.

Also within this overarching Federal web site would be the specific forum for all the major groups of native animals. IE birds, mammals, reptiles, amphibians and fishes. Within each of these there could be pages for the various animal families. Each site would have an Administrator/moderator with a Deputy on call. These Administrators would be in constant communication with the relevant Federal or State agency and would have the role of maintaining movement records. (Note that this idea is for a world where common native animals such as Bluetongues, Bearded Dragons, Brushtailed Possums, Zebra Finches and bits of common animals such as skins or skulls in schools or local museums, may no longer attract the need for permits). In other words, these Administrators would be maintaining records for the movements of high value, rare and endangered species primarily. Those high value species which are already 'out there' e.g. Rough Scale and Green Pythons, the various goannas and turtles could continue to maintain their records with the systems currently in place. In the new scheme, all permit holders will pay a fee at a State level. This need not be very high, unless the species carries the fee rather than the individual transaction. IE, high value animals such as Green Pythons will fetch a higher fee than Knob Tailed Geckoes. Another approach may be to charge a 10% of sale price. In this case the more profitable animals will fetch a proportionately higher fee than cheaper or less profitable ones. This regime has the benefit of making the rarer animals (and therefore those most in need of protection) highly valuable to all. Money raised will go towards the administration of the new regime and where appropriate, to indigenous land owners who have contributed animals to a captive breeding program. EG West Arnhem Land Aboriginal people should receive some benefit in the case of the Oenpelli Python and *Egernia obiri* (if it is not already extinct).

Importantly, what is proposed above continues to give the state and Territory N P & W Departments regulatory control and supervision as happens now. The main difference is that their focus would be on high value species. They would be in a co operative partnership with the private sector in a harmonised conservation effort which should result in more potent conservation outcomes than is happening at present.

The role of zoos and wildlife parks

The main problem with zoos concerns their critical mass. As discussed earlier we are facing a wave of extinctions. There are not many 'A' class zoos and wildlife parks in this country - maybe 20. There are simply not enough of them to be a significant contributor to the sheer numbers of Wildlife Keepers needed. Zoos do have a special role however in keeping the large and difficult species. With their knowledge and resources they are able to keep the highly speciallised animals such as Koalas, Cassowaries and echidnas. Animals like this could not be

kept by the suburban Wildlife Keeper. The major zoos and wildlife parks should have a focus on rare and threatened animals in their region. E.g. Adelaide Zoo should take the lead in captive breeding of the Pygmy Blue Tongued Skink and the Yellow Footed Rock Wallaby. Melbourne Zoo should look after the Western Barred Bandicoot etc. The major zoos could also be the administrators and repository of the stud books for the various animal groups. The other new role that could be done by zoos and wildlife parks is to set up a web based information site, with a forum of experts, to disseminate information on how to keep all the various native animal groups. EG, on Saturday morning you have someone from Melbourne's Reptile House sitting in the chair for a live chat dealing with issues such how to feed goannas like *V. eremius.* On Saturday afternoon you have a bird person from Perth online, dealing with how to implement some form of avian quarantine in pet shops. All these topics will be advertised in advance on the web and the conversations will be recorded, cataloged and form a living and growing online library accessible to all. The zoo vets could maintain a current list of contacts for veterinarians in private practice who specialise in native animals. Thus the nation wide zoo web site could become a one stop shop for all info relation to animal husbandry. On-line advertising could appear on this forum. Obviously the zoos themselves could advertise here, in addition to products and services available at pet shops, vets and aquarium shops. Money gained through advertising would be used to defray the cost of zoo staff devoting their time to this activity.

An alternative method of information dissemination could be a 'phone-in' where this function could be done over the phone. Only zoos and the bigger wildlife parks can do this sort of thing. It would be a brilliant way for zoos to make a very real contribution to wider conservation goals in the national community and at the same time, better use the knowledge of their experienced staff and promote their own establishments.

Zoos and the animal welfare organisations. Zoos have been the traditional reserve of criticism by animal welfare/rights groups such as People for the Ethical Treatment of Animals (Peta) http://www.peta.org/. I have much in common with the people in PETA and the RSPCA. Most of what they do is excellent work. But, like most organisations involved in this arena they have not recently reviewed their role in the Big Picture. These organisations have been leveling the same criticism at zoos for perhaps a hundred years. They are preoccupied with concern for bears, lions, tigers, elephants, zebras, the great apes and the like. In reality these animals generally constitute a small part of most zoo's collections. By far the majority of the inhabitants of zoos are the smaller vertebrates. Amongst these most of them thrive in a captive setting. Zoos do not want to be bothered with the effort involved in keeping animals which require are great deal of maintenance unless they are highly charismatic animals that attract good gate takings. Such animals include Pandas for instance. Zoos are expert at keeping and breeding the smaller birds, mammals and reptiles. When watching Meerkats, otters, finches and snakes (as a small sample only) in a good zoo, it is hard to imagine that these animals are not happy. Most are unaware that they are even in captivity and demonstrate this by breeding up to a point that the keepers have to separate the boys from the girls or have some individuals desexed. Zoos and wildlife parks maintain a wide range of animals of many species which live in comfort for a much greater life span than their contemporaries could ever dream of in the wild. And the survival rate of their offspring in a zoo setting is many times greater than that which would occur in the wild. In Australia, being bogged down with concerns for the mega fauna in zoos (whilst

having some veracity) is to loose sight of the Big Picture in terms of the gathering tidal wave of vertebrate animal extinctions.

NGO conservation agencies

In the scenario that I propose there would be a need to harmonise the efforts of state Govt. parks and wildlife agencies, and NGO agencies such as the Australian Wildlife Conservancy (AWC) Australian Bush Heritage (ABH), zoos and wildlife parks and Wildlife Keepers. EG Zoos keep the large and difficult spp. such as cassowaries, Banteng and raptors, the AWC and ABH focuses their property acquisition and management on a bio-regional basis to conserve specific threatened groups. Wildlife Keepers breed those birds, mammals, reptiles, amphibian and fishes that are easier, valuable and smaller (but not exclusively). Private keepers will be self funding through trade and sale.

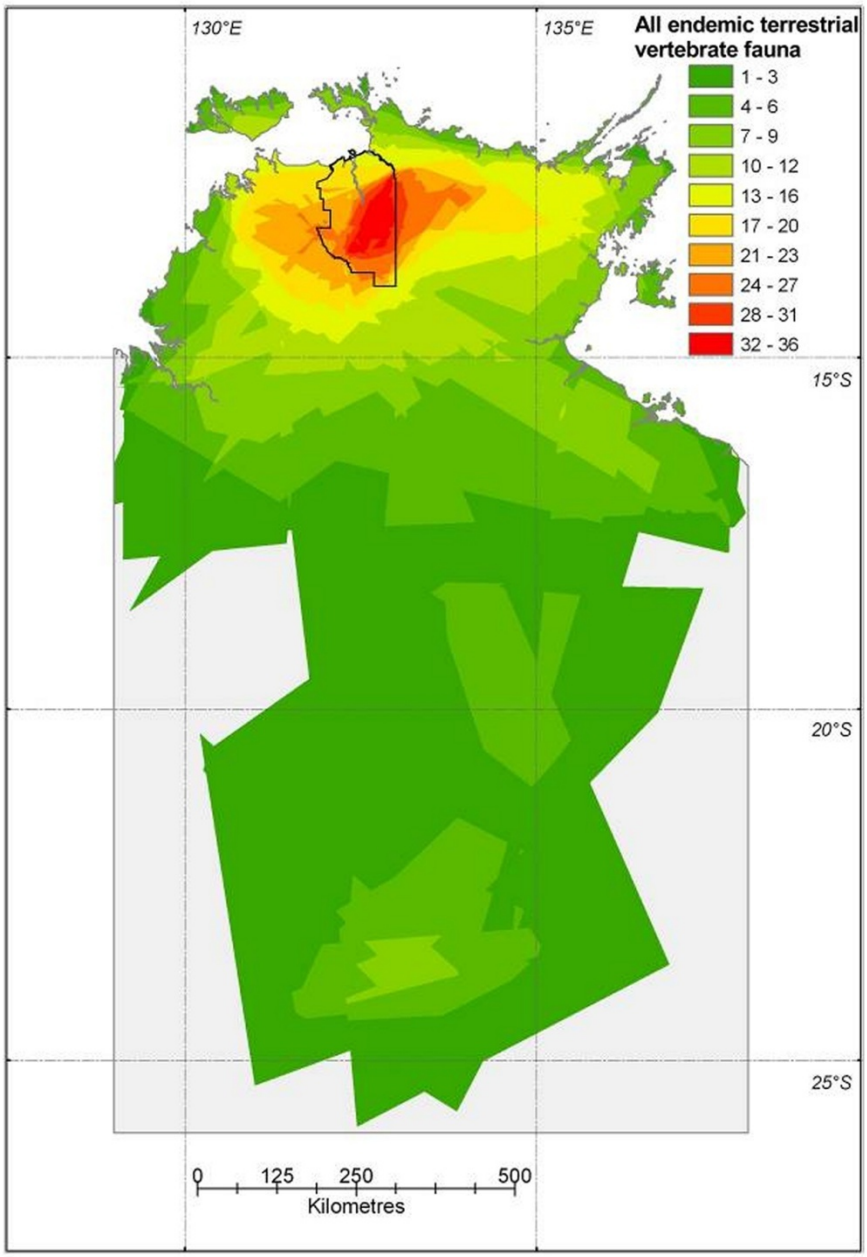
Indigenous issues

This applies particularly to central and northern Australia

a. Aboriginal people stand to be major losers if things don't change. Traditional owners may not realise it yet, but they are facing the physical loss of species which feature in their cultural history and cultural and personal identity. (In the world of traditional Aboriginal people, the natural resources are infinite – they always have been. Extinction or near extinction is a concept that they have never had to face.)
b. Aboriginal people could be winners at several levels if they were given the opportunity to become involved at some level in the breeding and trade of rare and valuable animals which occur on their land. At the present time (in the NT at least) it would appear that the NT Government, Parks Australia and the Land Councils are being passively resistant to opportunities to benefit traditional land owners which could, at the same time, shore up the conservation security of species. Why is it that the Governments and Land Councils sit back passively and produce insurmountable hurdles to such proposals? In these desperate times they should be proactively seeking out such opportunities for their land owning, Aboriginal constituents. All of west Arnhemland and most of Kakadu is Aboriginal owned. This is also the region of the NT where the highest density of endemic plants and animals occur. Many of these species are at the high end of the value scale and could spawn a good business whilst assisting with species conservation. This situation id made all the more desperate in light of the uncontrolled wildfires which are sweeping through this biological hot spot, eg: "*Analysis of a 16-year fire history (Edwards & Russell-Smith 2009) demonstrates that the fire regimes of the Arnhem Land Plateau are "characterised generally by high annual frequencies (mean = 36.6%) of large (>10 km2) fires that occur mostly in the late dry season under severe fire-weather conditions". "Collectively, such conditions substantially exceed defined ecological thresholds for significant proportions of fire-sensitive indicator rain forest and heath vegetation types, and the long-lived obligate seeder conifer*

tree species, Callitris intratropica. " Quote from Nature Territory. Northern Territory Field Naturalists Club Inc. Feb. 2010.

The map below shows the density of animal endemism in the NT and is courtesy of John Woinarski and the NT Parks and Wildlife Commission.



c. Joint management of national parks. All around Australia more and more national parks are being given over to the concept of being jointly managed by the

Government park authority and the traditional land owners of the area. I see a great opportunity for the indigenous joint managers setting up captive breeding colonies of important and threatened animals of that region. These animals may be of great cultural significance but could be struggling to survive in a changing natural world. Each park could have its small ark of animals being bred for release back into the wild with some being sold to wildlife enthusiasts for further breeding remote from that park. Money raised would be used to help fund the project. Such as scheme sees winners on all sides. EG such a project would:

1. Widen the diversity of employment opportunities for young indigenous Rangers.
2. Create small business opportunities in regional and remote localities.
3. Assist to familiarize indigenous staff with their wildlife and threats to its survival.
4. Provide a new and novel role for the national park, ie producing, not just protecting wildlife.
5. Via royalties, provide an ongoing income for the parent project.
6. Provide a boost to the population dynamics of the wild population of animal species at risk.
7. By selling animals to appropriate third parties, achieve the aims of having numerous secure populations of rare of threatened species remote from the Park. This maximises genetic diversity and offers a form of insurance should some tragedy befall the original populations, either wild or captive.

d. In the north of Western Australia cane toads are about to spread across the Kimberly. The Kimberley Land Council and the WA Government should be urgently and actively recruiting experienced reptile keepers across Australia to take snakes, lizards, turtles and frogs into protective care and for breeding. The massive income windfall generated by resource development in the north of that state could provide more than enough cash needed to kick start an extensive, 'safe custody for native animals' program. This could generate short and long term income for Aboriginal people of the region via joint ventures and other arrangements.

e. Proportionality. Aboriginal people in the NT (and probably elsewhere in the northern half of the continent) can legally kill any native animal in any quantity. It makes no difference whether or not it is an endangered species or whether or not they are in a national park. Aboriginal people do not need to be land owners to do this. They may be city dwellers who can and do, drive out to national parks on weekends, shoot a bag full of ducks and collect a sugar bag full of turtles and drive back to their city home and hand them over for domestic consumption amongst friends and relations. Traditional landowners should be permitted to hunt and otherwise derive benefit from their land. After all, they have been hunting animals for food since time began and it is their land anyway. But there are a couple of vexatious aspects to this in the NT, and maybe elsewhere. At the same time that Aboriginal hunting parties can scour a national park shooting anything that moves, an experienced reptile keeper/breeder will not receive approval to collected say, 2 pairs of Black Palmed Rock Monitors, in a park or reserve for captive breeding even if the offer is made to negotiate benefits for the land

owners. In times of "catastrophic declines", to quote Woinarski, there is something profoundly wrong with this. The question arising from this situation is; - if it is OK for one sector of the community to kill any species in any number in a park or reserve, how can it be wrong to issue a limited number of permits for experienced Wildlife Keepers to take a small number of animals from that same park or reserve for the purpose of producing more individuals of that species? (And this question does not imply any criticism of Aboriginal people), but rather the Parks and Wildlife agencies for failing to exercise proportionality and common sense. I recognize here that the agencies are probably constrained by their legislation. But are they making any significant move to amend that legislation? I doubt it.

Issues yet to be fully fleshed out

1. Participation by schools as part of a broader education strategy. How do we dismantle the legislative barrier to young people keeping and thus valuing our wildlife? Will schools, that often keep animals such as fish in the classroom and who lead the way in other conservation projects such as monitoring and surveying, be invited to be formally involved?
2. At the opposite end of the spectrum I propose a new, top rung in the Wildlife Keepers hierarchy as defined by the various state wildlife agencies. This new, elite classification would be called Conservation Keepers or Wildlife Heritage Keepers. These highly experienced and motivated people will be like auxiliaries to the Parks and Wildlife Service itself. They will be the first recipients of rare and endangered species for captive breeding and will not engage in any form of hybridization of target species. They will work hand in hand with the biologists, permits and compliance people in the park service. Ultimately the young animals produced by Conservation Keepers can be on sold to people in the next most senior level in the Wildlife Keepers hierarchy. Sales may well be facilitated or overseen through the Parks and Wildlife bureaucracy. The Conservation Keepers will be clear beneficiaries of these sales. Conservation keepers will be totally unlike conventional pet owners and will not engage in morphing or hybridizing of high conservation value species without jeopardizing their elite (and valuable) status.

2. The issue of genetic diversity. We are all aware that long term viability of a species depends on wide genetic variability. It is for this reason that the major zoos and wildlife parks are not, on their own, suitable for captive breeding enterprises. If we look at the Northern Quoll as a case study, the situation would need to look like this: - Right around Australia there would need to be many quoll keepers. Northern quolls in captivity will have been drawn from one major region e.g. Kakadu and West Arnhemland. If quolls are collected from places far apart from one another within this region then the resulting captive population will have great genetic diversity but will not cross the invisible line that separates regional races. IE the west Arnhem quolls won't be bred with Daly River or Kimberley quolls. Biologists would be able to specify an optimal number of animals to be in the total captive collection. Probably a minimum of 50. These animals would be kept by approved Conservation Keepers in all states in Australia. A centrally located stud book (kept as a web site forum) with one or two administrators who do regular

updates as movements are completed and emailed to him or her. Owners will then be able to move young stock from place to place including state to state to ensure reproductive viability over time. This is especially important for quolls and other Dasyurids as they only live for 3 or 4 years, less in the case of marsupial mice.

3. The issue of non-committed pet owners. There is a need to separate 'Wildlife Keepers' from mainstream pet owners. Vast numbers of regular people can be seduced into taking up wild animal pet ownership because it seemed like a good idea at the time or is a fad. We do not really want this class of person to enter the realm. The ownership of wildlife as pets should largely be restricted to people of passion and commitment. This limitation would assist with the problem of how the governing agencies cope with the numbers of new species being held by people as detailed on page 16 above.
4. What is a "pet"? E.G., Is a Death Adder a pet?
5. There is a need to demonstrate that keeping and breeding native animals is a legitimate end unto itself and need not be a means to an end, (e.g. need not be a conservation or preservation strategy.) A component of this could be a retrospect in the form of a 'what if', given the already catastrophic record of extinctions since 1788. How does contemporary society view living, but captive remnants of species which are now extinct in the wild? These include the Chinese Alligator, the Pierre David's Deer, the Edwards Pheasant, the giant Soft Shelled Turtle and the Scimitar Horned Oryx just to name just a few. Are these seen by the general populace as redundant, useless? Or as a gene pool, always with the possibility of being reintroduced to their natural environment (however unlikely that scenario is?) Would they be seen as reminders of the folly of our culture/society? Or do people simply rejoice in the fact that at these wonderful animals are still with us?
6. There is a need to get people to contribute to a complete list of Australian species of plants and animals that have been saved from extinction or near extinction by direct action intervention. This could include the Fox tailed Palm, the Hairy Nosed Wombat, the Coroborree Frog, Lake Eacham Rainbow Fish, the Yarra Galaxia, the Tassie Devil, the Tammar Wallaby, the Western Swamp Turtle, the Numbat and lots of others. The list alone would make a powerful argument before another word is said. The list should also include those that would be with us today if direct action had occurred in the past IE the Tassie Tiger, Pig Footed Bandicoot Mt Lofty Scrub Robin and Toolache Wallaby etc.
7. There is a need to develop the lists of animals which may or may not be the subject of captive breeding. There will be 4 categories each within the groupings of birds, mammals, reptiles, amphibians and fishes: -

    1. **Those animals which are secure and not in need of captive breeding intervention.** This does not mean that people should not keep them if they wish. These may be the animals with which children, within families, begin their keeping careers.
    2. **Those animals in need of intervention but which have specialised captive needs and are generally beyond the abilities of private keepers.** These animals could be the focus the major zoos, wildlife parks and the AWC. These would include species such as Tassie Devils, Platypus, cassowaries, raptors and koalas.

3. **Those animals which are small and 'uncharismatic' and would not (for the most part) be sought after by private keepers.** In the reptile world these would be many of the smaller skinks and maybe blind snakes. This is not to say that there would not be a thriving Blind Snake Keepers Association in the future!
4. **Finally, and the primary focus of this exercise, are those animals which are suitable for captive living, are in need of conservation intervention and are desirable/rewarding to keep.** These are the primary 'target species'. Permits to take, keep and breed Target Species would not be given out willie nillie. Only people with demonstrable experience and skill would be permitted to take and keep 'high value" target species such as Oenpelli Pythons or *Egernia obiri* (if it is still extant.) Each state would have an expert peer committee which would oversee high end permit applications in concert with the relevant park agency. The Park official need not have the final say

8. There would be a rush to pick up the high value and popular spp. but nobody will want to take on the more obscure animals. As an example, it may be possible to get lots of people to keep quolls as they are frisky, unusual and can be hand tame. But how would you interest people in the Grasslands Melomys on the other hand - these are plain looking brown rats that are highly strung and generally not 'handleable' without being bitten? Is it possible to get lots of people to take these into captivity in the long term to save them? I am not so sure. But this problem is not so great that we should abandon the whole idea. Realistically speaking, we will have to accept that there will be some cherry picking of the species at risk. We can't save them all, so we will have to concentrate at some stage on those which are savable. And these will most likely be the colorful, cute, rare, unusual and suitable to the suburban setting. In a way this rules out things like emus, koalas dingoes, cassowaries and a whole range of little brown birds, mammals, reptiles and fishes. Governments need to fund "direct action" conservation agencies (this rules out Land Care, and those small habitat restoration groups. These have an important role but it is different from "direct Action" which in my view encompasses direct intervention such as captive breeding or fencing out threats like ferals, fire and weeds from properties such as those run by Bush heritage, The Australian Wildlife Conservancy (AWC) and the Myer Foundation) such as Bush Heritage, zoos, wildlife parks, the AWC and wildlife keeping associations (e.g. ANGFA) to have a role in breeding the non "commercial" threatened species. Emphasis should be on funding such agencies to take on species in their region. EG ANGFA Victoria should get a grant to assist members to keep Victorian threatened fish. Bush Heritage should get specific grants to target things like the Numbat and Yellow Footed Rock Wallaby where they have properties within the range of these species. Therefore, if (say the AWC) has a property in the north of the Flinders Ranges in SA, they should get separate grants from the SA Govt as well as the Federal Govt. for each of any one of a range of threatened plants and animals in that region/ on that property.
9. From where comes to food for reptile eating reptiles, or fish eating reptiles or frog eating reptiles?
10. Pet Shops. What is their role in all of this? Are pet shops destined to the bin of history? Will all sales of native animals be direct from breeders or highly speciallised retailers – primarily over the internet?

11. Hybridising. Some reptile keepers (especially pythons keepers) are hell bent on converting their pure bred snakes into things that look like living barbers poles. They have no hesitation in cross breeding related species to see what comes out. Mongrel snakes can even fetch a higher price in the market than pure bred individuals. Hybridisation is an undesirable side line to the keeping of reptiles. If rare or endangered species are to be injected into the private reptile market there may be a need to somehow regulate this activity. (See 2. Above.)
12. Loss of ecological fitness. With each successive generation of captive bred animals it is commonplace for those animals to loose the 'sharp edge' which allows them to survive in the wild. This will happen to different groups at different rates. Also, the reclaiming of ecological fitness (if animals are released to the wild) will happen at different speeds. In the context of this essay however, where there in no plan to release animals – ecological fitness does not have the same relevance. Indeed, as the pendulum swings away from an animal's ability to survive in the wild, it is likely that the same animals will become more suited to a life in captivity.

Objections and Objectors

The following list recognizes some of the objection which would quickly arise if Governments were to ease restrictions of captive breeding and commercialization of native wildlife. There are many counter arguments that can be put forward with veracity. For decades there have been criminal elements in the native pet trade. At times there has been cruelty and unacceptable animal husbandry episodes. Unwanted animals have been dumped in foreign bushland and the shame list goes on. In many areas however, Federal and state legislation has saved Australia from the problems being experienced by countries such as the USA. In America and other countries excessively libertine legislation has allowed intractable problems such as private ownership of Great Apes and big cats to be possible. Australia is the lucky country in this regard. We are now relatively well placed to embark on a strategic loosening of the legislative ropes whilst at the same time being cautions and reviewing progress going forward.

These following issues need to be examined in detail:

- Stephen Garnett says that critics will see this as a "*land grab"* of animals. IE; unethically taking advantage of the extinction threat to steal animals away into private collections.
- "*More money should be spent on national parks and off park habitat restoration, not on putting wildlife in cages."* This is a common comment but sadly, putting more money into on and off park land management – whilst necessary and desirable - will not significantly change things at the national level. Appropriate management of weeds, feral animal's, erosion and fire is impossibly expensive yet with no guarantee of lasting or widespread benefits.
- *"It is cruel to keep wild animals in cages*." The animal rights people are trying to put a stop to the sale even of cats, dogs and rabbits in pet shops because it is '*cruel'*.
- Some will argue that *"We have a national parks and reserve network to protect and conserve our native wildlife."* The truth about that is both sobering and sad.

- *"You can't save them all!"* Some will say. That's right many are doomed; but does that mean we should not save any? See Possingham et al http://www.smh.com.au/environment/animals/survival-of-the-cheapest-20110810-1imox.html
- Another objection will come from those who claim that; *"People should not be able to buy or sell wildlife."* And they will say -*"If animals are financially valuable, an illegal and corrupt trade will inevitably follow." "Increased legal ownership of animals will inevitably lead to increased illegal activities, especially at the high value end."* None of these points are necessarily true of course; in fact it is easy to argue the opposite.
- *"What about animals escaping and becoming pests in new areas such as the Koala has in the Adelaide Hills.?"*
- *"There will be more smuggling out of the country*!" They will cry.
- *"There could be clandestine illegal breeding, sale and trade in endangered species."* Given the projected scenario for most of our Endangered spp., this might be a good thing!
- *"This is not conservation."* They will say. Yet when one looks at the formal definition of conservation, it is easy to ague that it is conservation.
- Others will argue *that "Children should not be allowed to keep an animal as it could suffer a cruel accidental death from neglect or the 'whatever' syndrome."* (the animal that is, not the child)
- *"They all end up dying anyway."* Some will say. Yes, true. But equally true for animals living in the wild.
- *What happens to surplus and unwanted animals?* If an Ace snake keeper is killed by his Taipan, does the family let it go in the neighbors back yard? Or, does the little boy who grows up, tip his pet turtles into the local creek? Do we have to put unwanted animals put down the way we do with dogs and cats?
- Native animals can pose a health risk to their owners. EG Salmonella from turtles and toxoplasmosis from Dasyurids.

Finally, in overview, none of these objections can seriously withstand the force of the ultimate counter alternative. In many cases the alternative will be extinction.

The central question.

What is proposed in this essay is a profound departure from the way that things have always been done. These are changing times and the central issue must ultimately be faced by all Australians. The central issue is thinking about what this country wants in terms of species being saved from the extinction axe, but forever more persisting only in captivity. In other words: Is extinction better than captivity? It may be emotive to pose the following scenario, but it helps to frame ones thinking - Imagine (in the future) your grand children sitting around you on the floor and looking at a picture book of the animals Australia used to have. You will have to explain to them, how it was, that Australian's took the decision to let these species slip into extinction rather than keeping them in a network of captive breeding facilities in private collections. I know that I have to tell my grand daughter about the Northern Quolls, Oenpelli Pythons and Phascogales that I used to keep as pets - but she will possibly never see them, let alone get the joy of keeping one. But - if what is written here was implemented, she could both see and keep them - forevermore!

About the author

This paper has been formulated as an amalgamation of several different view points. My working life of 40 years has spanned the arenas of zoos, wildlife parks, national park management (Kakadu and Christmas Island), wildlife law enforcement and conservation policy development. This is an unusual combination and one which has armed me with a rare view of what is currently unfolding in the area of Australian conservation endeavors.

Greg Miles

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8 August 2011