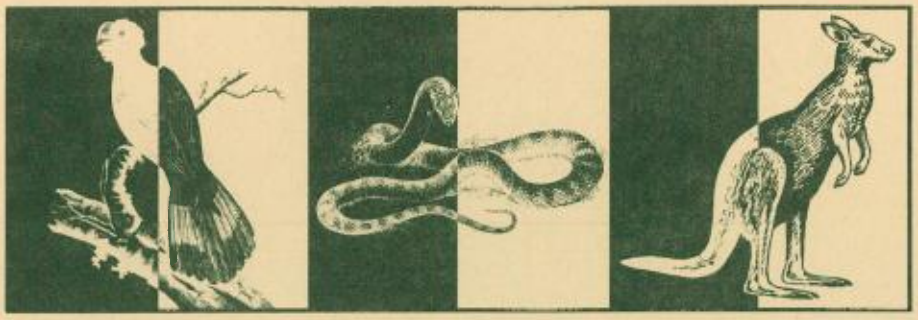
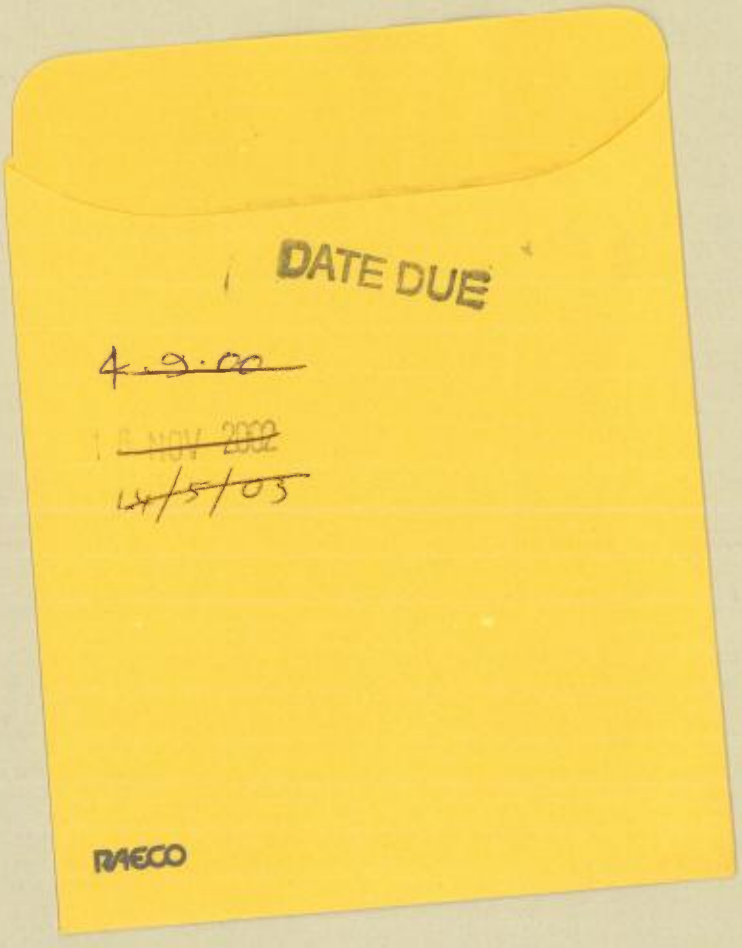


SUSTAINABLE USE OF WILDLIFE:

Utopian Dream or Unrealistic Nightmare?

Proceedings of a Seminar
on the Commercial Exploitation of Wildlife
held at Royal North Shore Hospital, St Leonards, SYDNEY
September 23rd and 24th, 1995

NATURE CONSERVATION COUNCIL OF NSW Inc.



		Date Borrowed	
Paul Hardey	Cumberland NPWS - Sydney Region	7.8.00.	6-11-00 5/12/00
L. Stanyte	WLU level 2	16.10.02	✓
Chris Allen	Merimbula Area	14/4/03	✓

Please Print Clearly

BORROWER	Location	Date Borrowed	

Please Print Clearly

SUSTAINABLE USE OF WILDLIFE:

Utopian Dream or Unrealistic Nightmare?

Proceedings of the Seminar
held at The University of Technology, Centenary Theatre,
Royal North Shore Hospital, St Leonards, Sydney
on September 23rd and 24th, 1995

Edited by Bruce Diekman,
Information Officer, Nature Conservation Council.

Printed on *Xerox Revive*, 100% recycled paper donated by Xerox.

Sustainable Use of Wildlife:
Utopian Dream or Unrealistic Nightmare?

First published in Australia, 1997, by the
Nature Conservation Council of NSW Inc.
39 George Street, The Rocks, Sydney, 2000

ISBN 0 949257 18 4

Cover Design by Anna Krawiecka

Printed in Australia by *UNSW Bioprinting*,
University of NSW, Kensington.

ACKNOWLEDGEMENTS

This seminar would not have been possible without the assistance and guidance of the Seminar Steering & Organising Committee:

Scott Cardamatis

Julie Hughes

Michael Kennedy

Dr. Judy Messer

Dr. David Murray

Vincent Serventy

Marjorie Wilson

Thanks also to NCC staff:

Bruce Diekman

Linda Tohver

Sid Walker

and all the speakers who gave their time and energy to make the Seminar possible.

The Nature Conservation Council is also especially grateful to the many volunteers who helped make the seminar a success, with their invaluable assistance before, during and after the event.

CONTENTS

WEEKS AS FAR

IES ARE ALSO LI

Session B

CONSUMPTIVE USAGE OF INDIGENOUS WILDLIFE

Session C

NON-CONSUMPTIVE USAGE OF INDIGENOUS WILDLIFE

FOREWORD

The principal aim of the *Sustainable Use of Wildlife: Utopian Dream or Unrealistic Nightmare?* seminar was an attempt to evaluate, by bringing together a wide range of stakeholders and expert opinion, the ecological impacts of moves to promote the commercial exploitation of Australia's indigenous fauna. The context was the ever increasing threats to Australia's biodiversity. In order to keep the scale of the seminar manageable, the major focus was on fauna, but this should not be taken as an intention to devalue the degree of the threats being experienced by native flora.

The Australian continent is internationally recognized as being megadiverse in terms of its heritage of biological diversity. Yet already within little more than 200 years of European settlement, 18 species of endemic mammals have become extinct (comprising half of all the world's loss of mammals in the same time). About another 40 species of Australian mammals are threatened with extinction.

Ten species of marsupials are presumed extinct and 49% of the remaining are listed as endangered, vulnerable, or potentially vulnerable. Recent reports indicate the very real vulnerability of Australia's song birds and frog populations.

Consumptive uses such as hunting, fishing and the harvesting of wild animals for trade are widely considered to have the potential to cause the extinction of rare or localised species.

At the same time, when biodiversity is deemed to comprise genetic diversity, species, ecosystems and ecological processes, the scientific understanding of the extent and complexity of Australia's biological heritage is seen to be still very incomplete. Any interventions should clearly be guided by the goal of ecological sustainability rather than commercial imperatives.

In the past, most Australian fauna has been protected from exploitation by legislation and it forms a very significant component of the nation's cultural heritage. In recent times, this cultural appreciation has done much to underpin the explosive growth of nature-based tourism which aims to be a model of non-consumptive usage of nature based attractions. Tourists in general appear to be highly sensitive to practices that harm or distress native fauna.

This nature-based tourism trend has been parallelled by a strong thrust for the commercial exploitation of indigenous fauna via consumptive usage (e.g. to create

products such as pet food, hunting, domestic pets, souvenirs, clothing and the restaurant industry). The illegal trapping and trade in fauna also imposes a major strain on the survival of some species. Animal welfare and ethical considerations play a major role in the public response to these trends. These powerful economic forces have been reflected in a range of institutional changes; in a number of cases the legal protection previously afforded our unique fauna has been weakened.

In the long tradition of Nature Conservation Council seminars, *Sustainable Use of Wildlife: Utopian Dream or Unrealistic Nightmare?* aimed to foster improved awareness and understanding of a controversial issue in all its complexity. The agenda attempted to address the full range of issues in a balanced and credible manner. Speakers represented the views of scientists, natural resource managers, business, animal welfare, Aboriginal culture and the nature conservation movement. All speakers were requested to acknowledge the principles of ecologically sustainable development (ESD) and issues such as ethics, economics and animal welfare matters not withstanding their individual focus.

It was also considered that the *Sustainable Use of Wildlife* seminar could assist the Nature Conservation Council if it came to formulate or review policy on any of the issues which were addressed. Reproduced at Appendix 1 is a copy of the Council's resolution on "Commercialisation and Consumptive Use of Wildlife" submitted to the World Conservation Congress at Montreal in October 1996.

The seminar was one of the most lively events held by the Nature Conservation Council but was deemed by all to have been run fairly by the time it concluded. We believe that a positive contribution was made to the ongoing debate within Australia that is but a part of the global concern regarding threats to biodiversity and the intrinsic rights of sentient beings.

We hope that the publication of the proceedings will enhance the quality of the debate and give rise to an improved understanding of the necessary restraints and practices that must be acknowledged if the sustainability of Australia's unique fauna is to be assured for future generations.

Dr. Judy Messer
Vice-Chairperson
Nature Conservation Council of NSW
July 1997

SUSTAINABLE USE OF WILDLIFE:
Utopian Dream or Unrealistic Nightmare?

Session A

OVERVIEW OF CURRENT LEGISLATION/ REGULATIONS

INTERNATIONAL UPDATE

by Michael Kennedy,
Campaign Director,
Humane Society International Inc. (Australia)

Michael Kennedy is Campaign Director for the Australian office of the Humane Society International, one of the world's largest animal protection organisations. He has worked on wildlife trade issues for nearly 20 years, with organisations such as Friends of the Earth, Fund for Animals Australia, and the World Wide Fund for Nature. He has also been an adviser to several Australian Government delegations to meetings of the parties to CITES, and co-founded the TRAFFIC Oceania office in Sydney in 1983.

The following overview represents a brief snapshot of the relationship between the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on Biological Diversity (CBD). It attempts to examine the potential for their combined efforts in better controlling international wildlife trade, and ends with some recommendations for appropriate action by the parties to both treaties and the Australian Government. This paper draws upon a recent publication by The Humane Society of the United States (HSUS) and Humane Society International (HSI), entitled, ***"The Biodiversity Convention and Existing International Agreements: Opportunities for Synergy"*** (Wold 1995), to which this author contributed.

The Global Wildlife Trade

The global wildlife trade is extensive. As TRAFFIC Oceania (Trade Records Analysis of Fauna and Flora in Commerce) has recently reported (TRAFFIC 1995), the annual world trade in wildlife products and live specimens is estimated to be worth somewhere in the region of US$20 billion. TRAFFIC also estimates that up to one-third of this massive trade is illegal, concluding that, *"Illegal and unsustainable wildlife trade threatened more that individual species. Population collapses can threaten entire ecosystems and thus, the quality of our own lives. Keeping wildlife trade under control will never be easy because the trade in wildlife involves more than 350 million animals and plants each year."*

Among the questions begging in the face of such startling statistics, are how much of this annual global trade is sustainable, can any of it ever be sustainable, and

what is an appropriate definition of sustainability? HSI believes that most of this trade is presently unsustainable; that much of it never can be, and that a globally accepted and ecologically appropriate definition of sustainability is an issue that should be urgently tackled by the Convention on Biological Diversity (CBD). HSI's views on these matter are consistent with many other international commentators who agree that the majority of the world's wildlife trade is unsustainable. Among them for instance is Lee M. Talbot (1993):

"There is virtually unanimous concern for the future of living resources throughout the world.... Virtually all species and stocks of wild living resources.... which are being harvested commercially are being depleted... Throughout most of the world, species and stocks of wildlife are declining, often rapidly."

The title of this conference, 'Sustainable Use of Wildlife: Utopian Dream or Unrealistic Nightmare?' is taken from the introductory chapter to HSI's 1994 publication, ***"Animals in Peril - How "Sustainable Use" is Wiping Out the World's Wildlife"*** (Hoyt 1994). John Hoyt, President of HSI, begins his introduction: *"If we want to protect bald eagles, should we open up a hunting season on them? In order to ensure the conservation of dolphins and whales, is it necessary to "utilize" them commercially? If we want to save wildlife in our national parks and preserves, should we open them up to hunting and trapping, so as to give the animals an economic value? While such propositions may sound absurd, they are logical extensions of the rapidly spreading philosophy of wildlife management called "sustainable use". According to this concept, in order for wildlife to survive, it must "pay its own way by being "utilzed" to produce economic benefits."*

Hoyt concludes his introductory remarks by noting: *"I believe that most people - indeed, the overwhelming majority - are willing to protect eagles, whales, whooping cranes, and other wild animals, even if we cannot make any money from them. But unless enough people speak out and take action to stop the sustainable use behemoth, wild animals will soon become just another commodity to be bought, sold, traded, and finally used up, when, inevitably, the demand exceeds the supply."*

Australia's Contribution to the Global Wildlife Trade

Australia, while not a major player in the global wildlife trade market place, is still no slouch, as the following table, prepared by the Australian Nature Conservation Agency shows:

NATIVE WILDLIFE EXPORTED UNDER THE PROVISIONS OF SECTIONS 10 AND 10A OF THE WILDLIFE PROTECTION (REGULATION OF EXPORTS AND IMPORTS) ACT, 1982

MANAGEMENT PROGRAMS (SECTION 10)

Taxon	State or Territory
Macropus rufus *Macropus fuliginosus* *Macropus robustus*	Western Australia
Macropus rufus *Macropus giganteus* *Macropus robustus* *Macropus parryi*	Queensland
Macropus rufus *Macropus fuliginosus* *Macropus giganteus* *Macropus robustus*	New South Wales
Macropus rufus *Macropus fuliginosus* *Macropus robustus*	South Australia
Crocodylus porosus *Crocodylus johnstoni*	Northern Territory
Crocodylus porosus *Crocodylus johnstoni*	Western Australia
Flora species as per the "Management Program for Commercial Harvesting of Protected Flora in Western Australia"	Western Australia
Trichosurus vulpecula	Tasmania
Dicksonia antarctica	Tasmania
Puffinus tenuirostris	Tasmania

CONTROLLED SPECIMENS (SECTION 10A)

Taxon	State or Territory
snake serum and sloughed skins snake venom and derivatives	ALL
Adiantum formosum *Calochlaena dubia* *Catostylus mosaicus* *Caustis flexuosa* *Craspedia chrysantha* *Doryanthes excelsa* *Gahnia sieberiana* *Macrozamia communis* *Pteridium esculentum* *Pycnosorus globosus* *Xanthorrhoea* spp	New South Wales
Anseranas semipalmata *Holothurioidea* *Thelenote anans*	Northern Territory
Banksia collina *Banksia integrifolia* *Banksia seratifolia* *Banksia spinulosa* *Callitris columellaris* *Caustis blakei* *Caustis flexuosa* *Caustis recurvata* *Dicranopteris linearis* *Gahnia sieberiana* *Gleichenia dicarpa* *Lepironia articulata* *Leptospermum spp* *Macrozamia communis* *Persoonia virgata* *Petrophile canescens* *Pultenaea villosa* *Restio pallens* *Restio tetraphyllus* *Sticherus flabellatus* *Xanthorrhoea australis* *Xanthorrhoea* spp native marine molluscs	Queensland
Xanthorrhoea spp	QLD/NSW
Durvillea potatorum *Gelidium asperum* *Latrodectus hasselti* *Posidonia australis* *Posidonia* spp *Xanthorrhoea semiplana tateana* native marine molluscs	SA

Dicksonia antarctica *Macropus rufogriseus* (max 500 specimens) *Nothofagus cunninghamii* Sphagnum moss *Thylogale billardierii* (max 500 specimens) angiosperms (seaweeds) marine macro algae	TAS
Calocephalus citreus *Craspedia chrysantha* *Craspedia globosa* *Dicksonia antarctica* *Nothofagus cunninghamii* *Pteridium esculentum* *Pycnosorus globosus* *Sphagnum cristatum* *Xanthorrhoea australis*	VIC
Lactrodectus hasselti	W A

Under the banner of the *Wildlife Protection (Regulation of Export and Imports) Act, 1982* (WPA), Australia clearly engages in a wide variety of wildlife export and import programs. There is also of course a flourishing illegal trade, for example targeting live birds (and eggs) and reptiles for export, and an illicit import trade in `traditional medicines' (tiger, rhino and bear parts, etc.) Some of our legal imports are trophy specimens from the United States and Canada, including such species as black, grizzly and polar bear, cougar and wolf.

Australia also continues to maintain its long-held policy of not allowing the commercial exportation of live native species, though an unfortunate anomaly still exists whereby wild caught native freshwater fish may be exported under the provisions of the Act. Despite an earlier agreement between conservation organisations and the Australian Nature Conservation Agency, to end this apparent trade "loophole", recent amendments to the WPA have failed to address this serious conservation matter. On the positive side, the provisions of the Act have been strengthened to include offences and punishment for acts of cruelty; to make illegal importation of species taken in contravention of the laws of other countries; and shifting the species management onus back on to the States and Territories; in other words, unless State and Territories have in place broad state-wide management programs for the species proposed to be exported, then the would-be exporter cannot receive an export licence.

Conservation organisations, in co-operation with the Australia Democrats and the West Australian Greens, also achieved some useful amendments to the Act. The

West Australian Greens also ensured the maintenance of the prohibition on the import of all leopard trophies, that was proposed to be lifted by the Government.

CITES and the CBD

The workings of CITES are familiar to most of us with an interest in and concern for wildlife trade matters. For a quick recap however, the Convention operates three Appendices. Appendix I includes *"species threatened with extinction which are or may be affected by trade"*. For these species, no commercial trade is permitted. Appendix II includes *"species which although not now necessarily threatened with extinction may become so unless trade....."*. These species may be traded under a permit system. Appendix III includes *"species which any Party identifies as being subject to regulation within its jurisdiction....."*. This last facility has basically been in a coma for 23 years.

One of the questions most often posed about CITES is - is it working? The Convention has certainly worked for some species, while it has been far less successful for others. I will not pursue this debate here, but will recall voting on behalf of the Australian Government Delegation at the Third Meeting of the Conference of the Parties to CITES, in New Delhi in 1981, in support of listing all parrot species, except for three common species, in the appendices. Despite this laudable conservation effort, the live bird trade has continued to send many parrot species into serious decline.

The principles behind CITES, involving the issuing of licences for species trade where "no-detriment findings" have been made, are in themselves sound. CITES often falters at this basic implementation level, and usually because the resources and administrative procedures, including effective species management and proper enforcement, are either non-existent, or wholly inadequate. This is particularly true in the case of exporting countries that are also developing nations. Their scientific ability to make "no-detriment" findings before issuing export permits, can be, to say the least, severely impaired through lack of monies and expertise, and the downward conservation spiral for many species begins.

The Convention on Biological Diversity (CBD) may be less well known. The primary objective of the Convention is as follows (Article I):

"The Objective of this Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the

utilisation of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding."

It is a broad umbrella treaty which really sets new conservation standards for existing and future agreements to meet, and contains articles covering an impressive array of crucial management issues, including access to genetic resources. This latter issue is a trade matter which deserves in depth review, but cannot be addressed here for the moment:

ARTICLE 6	GENERAL MEASURES FOR CONSERVATION AND SUSTAINABLE USE
ARTICLE 7	IDENTIFICATION AND MONITORING
ARTICLE 8	IN-SITU CONSERVATION
ARTICLE 9	EX-SITU CONSERVATION
ARTICLE 10	SUSTAINABLE USE OF COMPONENTS OF BIOLOGICAL DIVERSITY
ARTICLE 11	INCENTIVE MEASURES
ARTICLE 12	RESEARCH AND TRAINING
ARTICLE 13	PUBLIC EDUCATION AND AWARENESS
ARTICLE 14	IMPACT ASSESSMENT AND MINIMISING ADVERSE IMPORTS
ARTICLE 15	ACCESS TO GENETIC RESOURCE
ARTICLE 16	ACCESS TO AND TRANSFER OF TECHNOLOGY
ARTICLE 17	EXCHANGE OF INFORMATION
ARTICLE 18	TECHNICAL AND SCIENTIFIC CO-OPERATION
ARTICLE 19	HANDLING OF BIODIVERSITY AND DISTRIBUTION OF ITS BENEFITS
ARTICLE 20	FINANCIAL RESOURCES

Assessing and Interpreting These Treaties

Among questions that HSI and other conservation and animal welfare organisations are now asking in relation to the effective execution of these two treaties, is to what extent CITES implementation can be improved by direct linkages to the CBD. This involves an assumption that CITES can be made to work more effectively; that the CBD can help provide the extra resources needed; and that it can provide new guidance and direction on what is ecologically sustainable trade. It also involves accurately interpreting the intent and extent of obligations under both treaties.

In our publication, ***"The Biodiversity Convention and Existing International Agreements: Opportunities for Synergy"***, tabled at the 9th Meeting of the Parties to CITES in Fort Lauderdale in October, 1994, HSI has argued that there is indeed great opportunity for these two conventions to work closely together for the benefit of the world's wildlife, and that no conflict existed between them.

However, those people, organisations and nations that now have the bit between their teeth about the righteousness of sustainable use of wildlife, are doing their utmost to batter down the regulatory doors of CITES, and to apply global interpretations of the principles of the CBD that will free up the potential for increased international trade - and they are beginning to succeed.

As far as CITES is concerned, the pro-use lobby suggest that this treaty is actually an impediment to conservation goals and that the CBD actually promotes further wildlife trade. To illustrate this and other points throughout the following text, I have extracted quotes from the HSI publication described above:

"..... Some parties argue that CITES' restrictions threaten biological diversity, because the restrictions prevent uses that could raise revenues for conservation purposes."

Perverse logic, but more:

"..... some parties to the Convention on Biological Diversity have suggested that the Biodiversity Convention sets new standards for conservation and sustainable use which are inconsistent with standards established under previous international conservation agreements.... "

Standards may well appear inconsistent in the eyes of those promoting exploitation. A very polite response to the first assertion:

"..... the parties to CITES can permit increased trade in a species if a party demonstrates that the trade will not be detrimental to the species in question. The parties chose not to permit trade in some highly-publicised cases - such as elephant ivory and rhino horn - because supporters of trade failed to show that the species would not be placed in greater jeopardy or that the trade would benefit the species."

If a species is listed because it is threatened by trade, as agreed by all the parties, then you should not trade. To the second assertion we would respond with a statement prepared by the CITES Secretariat in Switzerland, which supports the views expressed by HSI, and clearly disputes the claim of inter-treaty inconsistency:

"This report (Wold 1995) represents views that are generally shared by the CITES Secretariat, which is also convinced that CITES and the Convention on Biological Diversity are complementary and not contradictory. Comparing the texts of the two treaties, the report provides sufficient evidence of this complementarity.

Those who consider that CITES is in <u>contradiction</u> with the Convention on Biological Diversity, and there are a number of such people, either do not know CITES correctly or make their judgement on the basis of certain interpretations of the Convention. Such judgements are a response to the way in which some individuals, organisations and even States wish to see CITES used and implemented".

Let me assure those in the Australian community that seriously advocate the increased utilisation of a large number of native species, and concerned conservation and animal welfare organisations, that the CBD is not an open invitation to trade in wildlife to the maximum. Pro- exploitation gurus simply want the global community to interpret both CITES and the CBD in their own peculiar way, in a manner which will least inhibit their utilitarian view of the world. As the HSI report stresses:

"The Biodiversity Convention's call for a new, sustainable future and rules to implement sustainable use applies equally to international commercial trade in wildlife."

"The Text of the Biodiversity Convention makes it clear that present unsustainable uses of biological resources must be modified or terminated to make them sustainable, not to maximise the commercial use of biological diversity."

"..... It is not a licence to use a species without regard for its survival; it is not a requirement that all species that could be used must be used; and it is not a requirement that all possible uses for given species must be permitted."

I would again stress that these statements by HSI are fully supported by the CITES Secretariat, though no doubt the pro-use lobby will continue to voraciously attack both Conventions where they are perceived to impede private commercial opportunities.

Recommendations for Future Action

Sanity needs to be brought to the debate on wildlife utilisation, and the Convention on Biological Diversity provides us with the opportunity to tackle the underlying problems of unsustainable international trade in wildlife. The following are some of the principles and recommendations that HSI has suggested need to be taken up under the auspices of the CBD, and that, in co-operation with CITES Parties, offer some hope for improvements. If we are to develop solutions to a crisis in global wildlife trade that is fast diminishing the world's stock of species, then these actions and many others must be addressed by the CBD and CITES with a large degree of urgency:

1. The Parties should recognise that not all components of biological diversity should be used due to a species keystone role in an ecosystem, for ethical reasons, or other reasons which the Parties enumerate. The Parties also should recognise that not all uses of a species must be permitted.

2. The Parties, working with non-governmental organisations, should develop a protocol that outlines the minimum requirements for a national framework for sustainable use, including:

- **(i) the necessary elements of a legal system;**
- **(ii) the necessary elements of a management program; and**
- **(iii) the scientific information necessary before a use can begin.**

3. The Parties should identify all provisions of other agreements, such as the permit provisions of CITES and the moratorium under the IWC, that help ensure the sustainable use of components of biological diversity. The Parties also should identify how these provisions of other agreements might be applied to other uses of biological diversity. For example, the CITES permitting system is highly relevant to discussions on standards for certification of timber as sustainably produced.

4. The Parties should focus their research and technical cooperation on finding existing projects that might be sustainable and mechanisms for making other uses sustainable. Research and cooperation should not focus on developing new uses of biological diversity. Also, the clearing-house should function as a mechanism for gathering and distributing information.

5. Because the international commercial uses of biological diversity usually lead to significant population declines for species, the EIA process of each country should extend to existing commercial uses of species. If significant adverse effects or unsustainable effects are identified, the country should implement measures to avoid or minimise the adverse or unsustainable effects. This is consistent with the Biodiversity Convention's goal to place existing uses on a sustainable path. Moreover, each proposed new commercial use of a species should be subject to the EIA process, because these activities are likely to harm biological diversity without adequate and effective planning.

6. In funding projects concerning sustainable use, the Parties should disburse funding only for making existing uses sustainable, including support for the development of national plans and research into the legal, management and scientific elements required to ensure that a use is sustainable. One specific project that could be funded includes funding to properly implement the "no detriment findings" of CITES in those countries which lack the funding to do so. This would directly effect the sustainability of trade in wildlife. Due to the current predominance of unsustainable uses, the funding should not be used to support new uses.

7. The Parties should identify the economic, management, social and legal conditions which characterise the sustainable or unsustainable use of a species or resource. The Parties also should identify uses, particularly consumptive uses (such as international commercial trade, ecotourism and subsistence uses) of species which are sustainable. The financing mechanism could fund this study. This recommendation also implements the Convention's call for research which contributes to conservation and sustainable use.

The Southern Bluefin Tuna (SBT)

It is important to mention here briefly, the control of commercial marine fish species, and commercial timber species. The issue of whether or not such species should come under the increasing control of domestic and global conservation regimes such as the Commonwealth's Endangered Species Protection Act, 1992 (ESPA) and CITES, is becoming a controversial one. The Southern Bluefin Tuna has become a classic case of overexploitation, and both conservation NGOs and other nations have tried to secure better management for the species under the ESPA and CITES respectively. Both Sweden and Kenya have tried in the past to list the Southern and Northern Bluefin under CITES, but have been threatened with

aid and trade sanctions by those nations paranoid about the "CITES EFFECT". Japan offered to remove Kenya's aid package unless Kenya withdrew their 1994 nomination, while Australia also joined the panic in diplomatic corridors, effectively killing the initiative. Australia has been asked on two occasions now to list the Southern Bluefin Tuna on CITES appendix II, and a decision on the potential for a listing at the CITES meeting in Zimbabwe in 1997 has yet to be taken. CITES, commercial fish and commercial timber do mix, and HSI will vigorously pursue this management option.

In conclusion, HSI believes that domestic and global programs and proposals for the sustainable use of wildlife are indeed an unrealistic nightmare. The Australian Government's role in ensuring that populations of wild species are not diminished by such trade is paramount, and as a minimum basis for action, should be pursuing the following actions:

1. **It should pursue CITES as if it were a conservation treaty and not a trade agreement;**

2. **It should pursue the implementation of all of the biodiversity treaty articles relevant to sustainable use, to ensure that all unsustainable uses are identified and eliminated;**

3. **It should seek the completion and global acceptance of extremely strict IUCN sustainable use criteria;**

4. **It should actively promote the types of recommendations suggested in this paper for financial and other co-operative regimes between the biodiversity treaty and CITES;**

5. **It should review all existing Australian commercial wildlife export programs for their biological and economical sustainability, applying new and rigorous criteria, with conservation benefit being paramount;**

6. **That each application for exploitation of a native species be accompanied by an independent EIA;**

7. **It should develop with some urgency, a new policy in relation to the export of wildlife products, limiting species permitted for export to those currently under agreed management plans and controlled specimens (after the above review and EIA process), and developing a list of "Protected Species" that may never be utilised for the export trade.**

References

Hoyt, J. (1994) *Animals in Peril - How "Sustainable Use" is wiping Out the World's Wildlife*, Humane Society International, Humane Society of the United States, Avery Publishing Group, New York.

Talbot, L.M. (1993) *Principles for Living Resource Conservation*, Marine Mammal Commission, Preliminary Report on Consultations, Washington D.C.

Wold, C. (1995) *The Biodiversity Convention and Existing International Agreements: Opportunites for Synergy*, Humane Society International, Humane Society of the United States, Washington D.C.

CONSERVATION THROUGH SUSTAINABLE USE OF WILDLIFE

by Peter Bridgewater,
Chief Executive Officer,
Australian Nature Conservation Agency

As Chief Executive Officer of the Australian Nature Conservation Agency since 1990, Peter Bridgewater has served on several international scientific and environmental bodies, including the IUCN Species Survival Commission, the IUCN Commission on National Parks & Protected Areas, and the International Whaling Commission. He was also Chairman of the 1996 Ramsar Conference in Brisbane. He has had numerous papers published in his fields of research interest: the survival of species, land and seascape ecology, biodiversity; and the conservation and management of mangrove and saltmarsh areas.

Is the title of this public seminar - *Sustainable Use of Wildlife: Utopian Dream or Unrealistic Nightmare?* a real question?

The answer of course is no, because sustainable use is neither. It is part of the World Conservation Strategy, and is already encapsulated throughout the Agenda 21 product of the 1992 United Nations Conference on Environment and Development (Rio Earth Summit), and is part of the philosophy of our major Conventions dealing with wildlife, including especially the recently concluded *Convention on Biological Diversity (CBD).* I might also observe it is also about wildlife in general, not simply mammals and birds - which is the perspective the program might give.

In agreeing to give a presentation at this seminar, I was requested to give a national up-date on legislation and regulation governing the use of native wildlife for export from Australia. However, in preparing my presentation, it became apparent that one cannot examine current policies and practices in Australia in isolation from what is happening elsewhere in the world. Many of our policies and legislative provisions reflect the philosophical views advocated elsewhere in the western hemisphere and transposed into Australian society. Australia is a Party to numerous international conventions and treaties and it is unrealistic to regard current policies and legislation as having been derived in isolation of those of like-minded societies. Just to look at two - the *Ramsar Convention* promotes

wise use, and the *CBD* promotes the twin aims of conservation and sustainable use.

There are fundamentally two issues around sustainable use which require consideration. Firstly, agreement that if a natural renewable resource such as wildlife is subject to any form of use - commercial or otherwise, that use should be structured and regulated to ensure that it is sustainable by the particular resource. There should be little disagreement with this principle! Secondly, and perhaps more contentious, is the growing concept that resource use, when sustainable, can be used as an economic instrument to create practical and effective incentives for conservation of wildlife outside protected areas.

World-wide, there is increasing attention being focused on the potential importance of sustainable use of wildlife as a complementary adjunct to conservation through protected areas. In practice the concept seeks to confer a commercial value on presently unprotected natural habitats, by adopting laws and policies which permit local communities to derive an economic benefit from the sustainable use of certain species of wild fauna and flora that are dependent on such habitats. These habitats often occur on pastoral or agricultural lands and are often regarded as unproductive, worthless land. These habitats often harbour wild flora and fauna that are regarded as agricultural pests or otherwise pose a threat to public safety. The development of strategies for the sustainable use of certain wild flora and fauna, in a manner that enables the community to derive an economic return, confers an economic value on such species and natural habitats, transforming such lands into productive units which contribute to the capacity of the landholder to derive an income. Wild fauna, flora and their habitats are thus more likely to be perceived by landholders as assets worth managing and conserving. These comments are perhaps more relevant to developing countries, but the basic principles do apply here in Australia.

The principal legislation in Australia governing the conditions under which native wildlife is permitted to be exported is the *Wildlife Protection (Regulation of Exports and Imports) Act 1982* (Wildlife Protection Act). The broad aim of the Act is:

> *"To ensure that all trade in wildlife is carried out in a sustainable manner which is not detrimental to the survival of the species or the ecosystem in which it occurs."*

This Act is also the principal legal vehicle by which the Australian Government discharges its obligations under *the Convention on International Trade in*

Endangered Species of Wild Fauna and Flora (CITES). It should be noted, though, that apart from export related issues, much of the policy on wildlife management is the prerogative of the States and Territories. They mediate this activity through a range of co-ordinating Ministerial Councils, including, especially, ANZECC.

The precautionary principle is deeply embedded in the Wildlife Protection Act. Periodic amendments to the original legislation have enabled the Commonwealth to exercise more flexibility in considering certain operations based on harvesting native wildlife. Notwithstanding these amendments, the precautionary principle continues to be at the core of the Act. Approvals for commercial export enterprises are granted for specific time periods and operators are required to fulfil certain monitoring and reporting requirements in order to demonstrate that approved harvest levels are within sustainable limits.

The Commonwealth is regularly faced with the dilemma of whether or not to recognise that a particular resource has a commercial value and grant conditional approval for its use. The alternative that would result from a totally inflexible prohibition on all forms of commercial use would be in many instances to assign a negative conservation value to the resource. Many species of native plants which are subject to commercial use under the "controlled specimens" provisions of the legislation, enable pastoralists to derive an income from their use. Pastoralists are dissuaded thus from perceiving such areas as worthless lands and converting them to improved pastures for grazing livestock. The tragedy of native grasslands in Australia and their attendant biota is testimony to the adverse effects of the "improvement" approach to land and resource management.

Should we prohibit all forms of resource use until such time as we possess all the necessary information in order to ensure that harvest levels are able to be sustained by the wild resource? There are compelling arguments in favour of adopting a more relaxed approach to the use of certain resources which are widespread and abundant. Resource management is an iterative process and there is considerable support, as advocated in the World Conservation Strategy, for management by experimentation (the so-called adaptive management). Two essential elements of management are adequate monitoring or feedback mechanisms, and the ability to apply safeguards when monitoring reveals adverse effects.

Regrettably, one can always point to some examples of certain resources which, in the past, have been exploited at levels beyond the capacity of the particular resource to sustain. Issues of Forestry and Fisheries are often appropriately cited

here. But as with everything, it is the pattern in the future which is important, as long as we can learn from past errors. While these observations are related to Australia, they are set in a global context.

It is extremely unlikely in the present environmentally enlightened Australian society that any government would survive if it adopted policies permitting the unfettered commercialisation of native wildlife. It is equally doubtful that the international community would permit the development of any enterprise based on the uncontrolled commercial use of a natural renewable resource. There exist today international instruments such as CITES and the CBD, to ensure that species do not become extinct or threatened with extinction by trade. In an effort to strengthen CITES further, many Party countries, including Australia, have chosen to implement stricter domestic measures than the minimum required under the Convention.

Additional to these measures, some countries and regional alliances are able to take unilateral action against a country which trades in a particular wildlife product and demonstrates little or no regard for the principles of sustainable resource use.

Legislative protection alone is insufficient to ensure that all species of wild fauna and flora are conserved. The majority of natural habitat and biological diversity in Australia occurs on lands, and in seas, which lie outside the protected area network. Effective conservation of these resources is the challenge that faces governments of today. It is important to understand that the concept of conserving natural biodiversity through the sustainable use of certain components is not being advocated to *replace* traditional approaches to resource conservation - rather to complement them. A critical question is whether or not our traditional approach to wildlife management has the potential to achieve the conservation goals that we all desire. We need to be quite cautious, however, that we respect and understand Aboriginal and Torres Strait Islander approaches to wildlife use, especially in protected areas which are their lands.

As we enter the 21st century, it will be important for governments and resource managers to have the ability to apply an array of management strategies that suit particular local socio-economic conditions.

Defined in its simplest terms, "sustainable use" may be interpreted as: *the use of a resource within its intrinsic capacity to renew itself and in a manner that does not compromise its long-term conservation*. Management regimes that are structured

to achieve this standard, ensure that a complete range of future land-use options are preserved.This objective applies equally to all forms of resource management, including nature-based tourism and the management of protected areas.

Sustainability is a phenomenon which cannot be guaranteed in advance. Management regimes that are constructed for the use of wildlife, while not being able to guarantee sustainability, must contain elements that will ensure that all necessary safeguards against over-use are in place. Among these elements, an effective management feed-back mechanism is perhaps the most important.

Monitoring the distribution and abundance of "managed" populations of wildlife is the only way in which Government authorities are able to evaluate the performance of their management regime and determine whether or not any particular set of prescriptions are sustainable by the particular wild resource, with no detriment to its long-term conservation. It is therefore critically important that **all** populations of wild flora and fauna which are subject to management involving the disturbance or removal of specimens for any purpose, are monitored regularly.

In addition to providing a mechanism to evaluate management, monitoring is used to determine the suitability of the timing and duration of harvest seasons, the size and/or composition of harvest quotas, or the number of permits that can be issued during any one season.

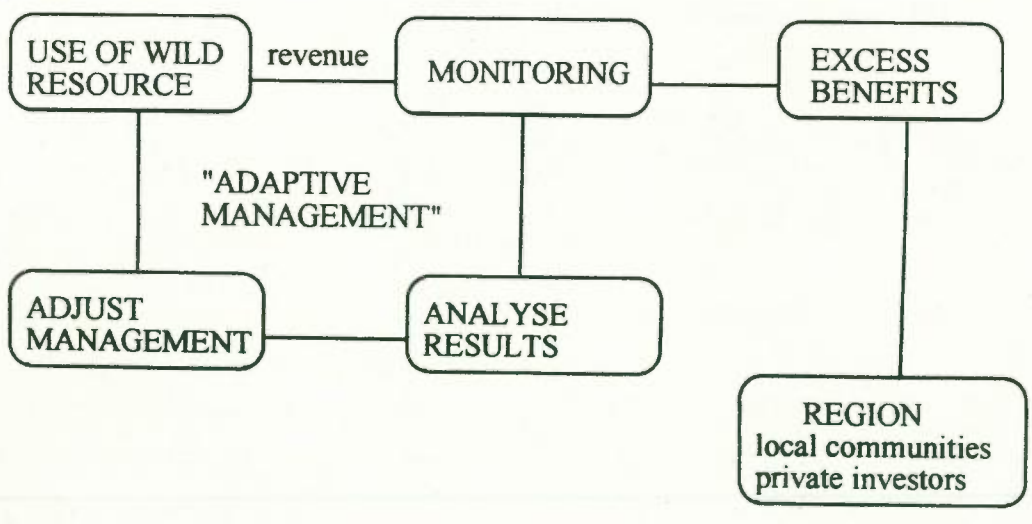


Figure 1 Simplified sustainable management system with self-generating funding mechanism.

Figure 1 presents a simplified model of a sustainable use management system in which revenue derived from the principal beneficiaries of resource use can be used to fund management related research and surveys, which in turn are applied to adjust the management system to ensure that the long-term conservation of the wild resource is not compromised.

Any management system that involves the removal of individuals from the population or entails some other form of interference or disturbance must include appropriate monitoring. Effective, scientifically-based monitoring and an administrative capacity to adjust management on the basis of monitoring results are critical to achieving the twin goals of sustainability and resource conservation. In order to be sustainable, harvests must be based on the recruitment potential of the taxon concerned, and not be dictated by external factors such as market forces. These latter factors have contributed to the depletion of many species of wild fauna and flora around the world and are chief among the reasons for the establishment of *CITES*.

Effective conservation of biological diversity in Australia will ultimately depend on the ability of Governments to conserve and manage essential habitats. A failure to do so will result in the long-term disappearance of many species, particularly those taxa which are habitat specialists or are confined to restricted and fragile habitats. In this regard Governments have established an extensive network of protected areas throughout the country in which many important and threatened habitat types have received legal protection. But the role of protected areas, although important, should not be regarded as the only tool available to the Governments of Australia for the successful conservation of biological diversity.

Careful strategic planning is required in order to ensure sustainable development which does not compromise the conservation of wildlife resources and land systems or future options for their use. Conservation of natural habitats on lands outside of protected areas requires the development and application of strategies, tailored to suit local socio-economic conditions, and which are designed to create incentives among local communities and landholders for resource conservation and wise use. And I particularly emphasise the importance of this to our indigenous peoples.

Declaration of protected areas appears often to result in conflict between the Government agency responsible for managing the protected areas and neighbouring rural communities, particularly when these areas are located in agricultural lands. Protected areas are obviously reservoirs of species of wild fauna

and flora, the territories of which often include adjacent agricultural land where their presence can cause damage and economic loss. Subsistence harvesting of wild fauna and flora by indigenous hunter-gatherer cultures, technically becomes poaching when undertaken on tribal lands which are subsequently declared as protected areas, regardless of the fact that these people have harvested resources from their traditional lands for millennia. The zoning of lands adjacent to protected areas, coupled with programs that enable local communities to benefit from the sustainable use of wild fauna and flora on these lands will reduce the potential for conflict between community land use systems and the management of conservation areas. In Australia though, the issue of continuing sustainable take of some wildlife species on protected areas has caused considerable discussion.

There is increasing recognition in Australia and elsewhere in the world that the formulation and implementation of national conservation laws and policies, in isolation from the general public, rarely succeed in achieving their purpose. Effective conservation of the biological diversity of Australia will depend on our ability now, to formulate practical policies and laws that take account of the needs of the general public and the nation s capacity to sustain economic development, within the overall rubric of conservation.

Realistic conservation laws and policies which are derived from community consultations, and thus ownership, and which take account of the needs of local people are more readily embraced by the general public. Such laws and policies are thus more easily implementable and have a greater potential to achieve their objectives. Effective conservation of wild fauna and flora in the 21st century will necessitate fostering partnerships between government and communities as shown in **Figure 2** (next page). Figure 2 presents a simplified model of the interrelationships that should exist between the key elements on the administrative and implementation equation, for successful conservation of wildlife.

An essential feature of sustainable resource use is the application of systems, or partnerships, through which local communities or landholders:

i) are an integral element in the development and decision-making process; and

ii) derive an equitable share of the benefits, based on the real value of the wild resource, that accrue from the sustainable use of a species.

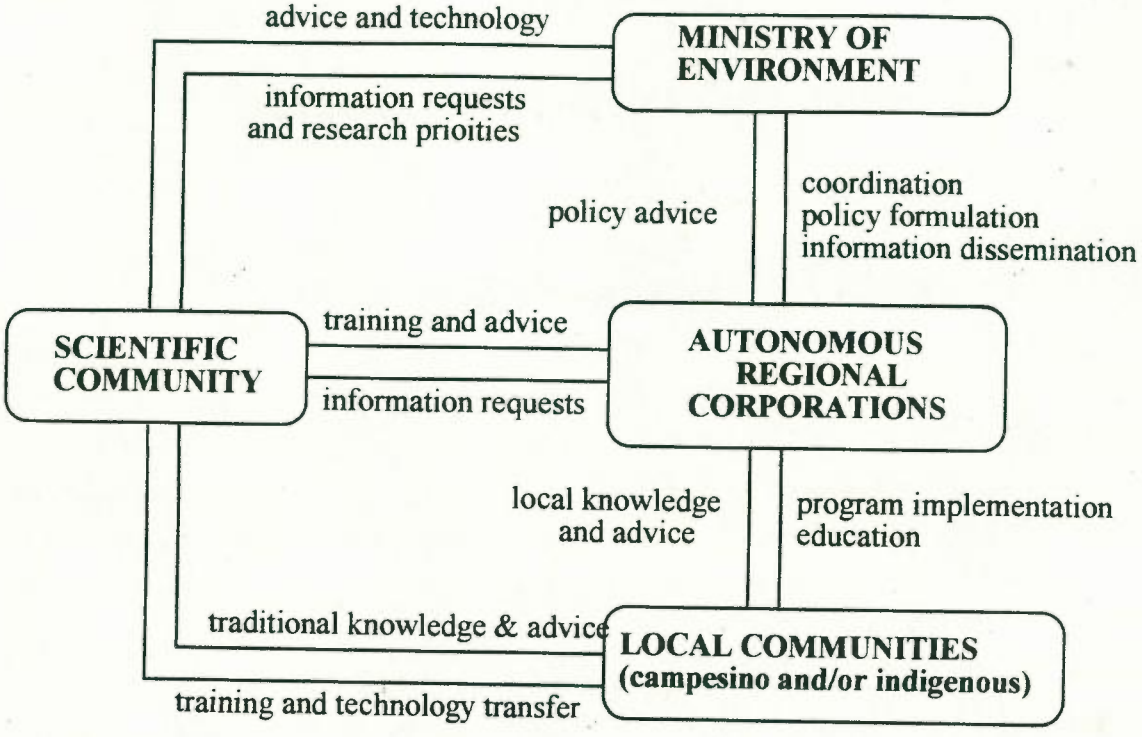


Figure 2 Conservation, consultation and communication organogram of the interrelationships between Government and communities (scientific, rural and indigenous)

Establishment of community marketing cooperatives or employment of agents to operate on behalf of indigenous or campesino communities, will ensure that communities market wild fauna and flora for a value approaching the real value to the end user. While this is a global framework, we need to make sure the Australian situation, which can be somewhat insulated, is in tune with this problem. So, no nightmares, but no pipe-dreams either. Just the gritty reality of coping with the dynamics of conservation in a rapidly evolving world.

WILDLIFE UTILISATION: A CRITICAL LOOK AT THE STATE OF PLAY

A State and Territories Update

By Peter Preuss,
President,
Australian Wildlife Protection Council

Peter Preuss is President of the Australian Wildlife Protection Council (AWPC), a voluntary, non-government conservation/animal welfare organisation based in Melbourne. For several years Peter was the Australian Conservation Foundation's 'Education Officer'. He currently works as a Teacher at the Woori Yallock Farm School specialising in Environmental Education as a tool to assist 'students at risk' meet their full potential. He is also the successfully published author of educational texts and environmental/conservation publications. Of particular relevance to this seminar, Peter edited the Australian Wildlife Protection Council publication, "Kangaroos - Our Wildlife Heritage, Not An Exploitable Resource".

Introduction

"The target of regulation of wildlife transactions is the supply and consumption of wildlife as commodities ...." (Halstead, B. Wildlife Legislation in Australia: Trafficking Provisions, Australian Institute of Criminology, ACT, 1994, p.4).

While Australia is a signatory to the Convention for International Trade in Endangered Species (CITES), the increasing trend of viewing wildlife as commodities is rapidly undermining wildlife conservation in Australia. The only ones benefitting are those who are cashing in on the exploitation of our unique wildlife heritage - be it those at the helm of the kangaroo, possum or mutton bird industries; the crocodile or emu farming entrepreneurs; or the smugglers and illegal traffickers of live animals.

Both legal and illegal exploitation of wildlife is facilitated by government policy, inconsistencies between State and Territory regulations and the grossly under resourced wildlife conservation agencies.

To date, however, the central question of whether 'wildlife' should be a 'commodity' to be 'consumed' has yet to be put to the people of Australia.

Consuming Wildlife

4 to 5 million kangaroos, euros, wallaroos and wallabies, together with tens of thousands of possums, crocodiles, emu and mutton birds are killed for commercial purposes each year. Flying Foxes, Bandicoots and Magpie Geese may soon be targeted for commercial wild harvest.

Countless Australian reptiles, birds and mammals are smuggled from Australia to fetch high prices in Europe, the USA and Japan after capture from the wild. Three wild birds die for each one that makes it to an overseas pet shop and the life expectancy of those that do make it is reduced from 50 to 5 years (Hugo Phillipps, 1994).

As well as a wide range of native reptiles and birds, Ringtail Possums, Brushtail Possums and Sugar-gliders are now legally sold in Australian pet shops to live their short lives in captivity within the required 2 x 2.5 metre cages.

Victorian wildlife shelter permit holders have already been receiving escapee or released pet possums since new wildlife possession and trade laws were introduced in 1992. The condition of most Wombats, Bettongs, Wallabies and Pademelons that are being kept in suburban backyards around Melbourne is alarming. Vets and wildlife shelter permit holders get particularly upset when they are called out to private homes to assist concerned keepers of these 'new-wave pets' to find such gross cases as Sugar-gliders with scalded bodies from excessive exposure to their own urine. The prescribed cage sizes are simply too small and keepers are generally ignorant of the needs of these wild animals (Ninon Phillips - RSPCA Wildlife Group - Pers Com).

Wildlife regulations do not consider the welfare of wildlife which have become 'commodities'. At the same time, an examination of the present situation quickly reveals that current regulations do little for the conservation of species in the wild state.

Wildlife Utilization and Ecologically Sustainable Development (ESD)

Increasingly, however, the commercial use of wildlife has been promoted as a means of providing an economic incentive for conservation in Australia (Hale 1994). This parallels the world-wide trend of commercial use of wildlife as a tool

for conservation as recommended by the International Union for the Conservation of Nature (IUCN) (McNeely, 1988).

While the emphasis of the IUCN policy of 'sustainable use' of some wildlife species was initially directed at 'developing countries', the concept has found its way into the language of Sustainable Development. The Rio Declaration promotes wildlife utilization as a conservation tool. The 170 nations attending the 1992 Earth Summit, including Australia, placed human beings at the centre of concerns for Sustainable Development (Principle 1), promoting the sovereign right for states to exploit their own environment (Principle 2) so long as that right equitably meets the needs of present and future generations (Principle 3).

Australians, including most within the mainstream conservation movement, have been quick to embrace the concept of Ecologically Sustainable Development (ESD). However, we have failed to consider two fundamental questions -what is it we wish to sustain and for whom do we wish to sustain it? As pointed out by Robyn Eckesley, these basic questions are presupposed in the sustainable development discussion although they are "logically prior to the strategic questions of 'How?' and 'By what means?' that have so far dominated the airwaves" (Eckesley, 1990; 95)

Few Australian advocates of ESD appreciate its implications. While terms like 'the precautionary principle', 'conservation of biodiversity and ecological process', 'intergenerational equity' and 'improved valuation and pricing of environmental resources' sound good, how have they been applied?

There is little evidence that these principles of ESD are being met. To scratch beneath the glossy surface of existing and proposed State, Territory and Federal wildlife laws reveals that there are no 'precautions'. As pointed out by one commentator:

"It is difficult to find unequivocal examples that demonstrate the sustainability of **consumptive wildlife utilization. It is even rarer to find examples that** demonstrate a clear benefit to the conservation of species in the natural state" (Nias 1994, p1).

Yet, the push to utilize wildlife continues from some surprising directions. While the 1985 CITES conference resolved to work towards the elimination of the collection of wild animals for the pet trade, Australia proposed and succeeded in gaining an unqualified listing for the Australian population of Saltwater Crocodile

into Appendix II at the 1994 CITES meeting. This leaves open the possibility of exporting skins from crocodiles killed in the wild, representing the thin edge of the wedge toward the exploitation of other "protected" species (ANZFAS Fact Sheet - Wildlife Exploitation, 1995).

In the introduction to his book, Animals in Peril - How "Sustainable Use" is Wiping Out The World's Wildlife, John Hoyt, President of the Humane Society International states: "These abrupt changes in current conservation policy by those responsible for protecting the world's wildlife are being undertaken quietly, behind the scenes, largely without the knowledge or consent of the general public. The only thing preventing universal application of the concept of 'sustainable use' has been strong and effective opposition from wildlife protection and preservation groups" (Hoyt 1994).

The Conservation Argument

A few species, such as the Golden-shouldered parrot indigenous to Queensland do quite well in captivity. Typically, however, none have ever left Queensland lawfully and many areas where the bird was once common are now void of this species (Roger Bilney - Pers Com).

The Australian Eclectus Parrot, the Superb and Swift parrots, the Nerethra Blue Bonnet, the Palm Cockatoo, the Glossy and the Carnaby's Black Cockatoos, the White-bellied Crimson and the Black Throated Finch and the Black-breasted Button-quail are all experiencing shrinkage of distribution and population declines as a direct result of commercial use (Phillips, 1994). And the list goes on and on.

To quote one State Wildlife Officer, "new state wildlife legislation such as that of Victoria, which actively promote the commercial exploitation of an ever increasing range of native Australian wildlife is bleeding the country dry of its wildlife heritage" (pers com - anonymous for political reasons).

Private bird keepers argue that they play an important part in wildlife conservation. They can keep rare birds from becoming extinct and potentially breed enough to one day re-establish locally extinct populations. For example, the wild population of the rare Orange-bellied Parrots is presently being supplemented with captive bred birds.

However, when the Taronga Park Zoo announced that it was the first to breed a particular sub-species of Glossy Black Cockatoo in captivity in 1993, there were

already 140 of these rare glossy-blacks in the care of members of the NSW Aviculture Society. The RAOU claims that "virtually all of the various Black Cockatoos in collections have been taken from the wild and that for even the most common caged Cockatoo, the Sulphur-crested, there is little attempt to breed in captivity (Phillipps, 1994).

Why should bird keepers trouble themselves with the difficult task of breeding when "the 'commodities' are available in the wild, requiring little in the way of capital to acquire, except for a knowledge of habitat, and some means of capturing and keeping them" (Halstead, B. 1994, pX).

Wildlife officers who have recently tried to determine the parental origin of some rare Black Cockatoos said to be bred in captivity have found that there is a remarkable tendency for parent birds to be younger than their off-spring. Unfortunately, this amazing feat of captive breeding is not unique to Black Cockatoos. The more difficult a species is to breed in captivity and the more valuable the animal, the less likely it is for individuals bred in captivity to bear any genetic resemblance to their captive parents (Bilney, R. pers com).

Not Just Birds

This phenomena is not limited to birds. It seems that most captive bred reptiles are born as adults given that it is almost impossible to find a captive juvenile Olive Python, Scrub Python or Carpet Snake... The great majority of reptiles traded both legally and illegally are in fact illegal wild captives.

The rare Oenpeli Python of the Northern Territory has been successfully bred in captivity. However, this species provides yet another fascinating example of the wonders of captive breeding. Though never legally exported from Australia, it was first bred in captivity in Germany in 1982 (Hoser 1993).

The Blind Eye of Government

State wildlife regulations are supposedly designed to protect wild populations and their habitats. Indeed the first point within the 'Guide to the Laws Relating to the Keeping of Wildlife for Private Purposes in Victoria' states that "wildlife must not be taken from the wild or released into the wild without the prior written approval of the Secretary to the Department of Conservation & Natural Resources ...." (page 1). However, we find species listed under various schedules for private ownership which have not been bred in captivity or which are so difficult to breed

in captivity that captive bred animals could never account for the number presently being traded.

One AWPC member developed a breeding program for Sugar-gliders. After two decades of hard and dedicated work, he bred enough to restock just a few sites from which the species had become locally extinct (Hackett, D. Pers com 1994). Yet today, a few hundred dollars can buy a Sugar-glider from any number of licensed pet shops in Victoria.

The Mangrove Monitor of Queensland is a particularly sad example. While not bred in captivity, Mangrove Monitors can be ordered from the same licensed pet shops that sell Sugar-gliders. Unlikely to live more than six months in captivity, the pet shop will gladly provide a replacement for the right price while pleading ignorance to the systematic destruction of the old-growth hollow-bearing Queensland mangrove habitat of the animal.

The Mangrove Monitor is just one of an enormous list of species available under various schedules and for various purposes in Victoria since the adoption of a new set of wildlife regulations in June 1992. With the appropriate licence and for the appropriate fee one can keep anything from the Australasian Shoveler to a Zebra Finch; sell anything from an Alexandra's Parrot to a Whistling Tree Frog; kill anything from an Australian Raven to a Wombat; process anything from an Emu to a Whiptail Wallaby. With a 'Commercial Wildlife - Wildlife Taxidermist' licence one can stuff just about anything.

The Evolution of Regulations

To ask the Victorian Department of Conservation and Natural Resources why so many species have been made legally available in Victoria is a fascinating exercise. The answer depends on just to whom within the Department the question is put. For example, the Victorian wildlife officers objected to the new regulations during the public consultation phase preceding the adoption of the new regulations, but were negated by others higher up in the bureaucracy (Pers Com - anonymous wildlife officers, 1995).

The Minister for Conservation at the time that the new regulations were adopted, Mr Barry Pullen, has since expressed concern over the new regulations (Pullen, B. pers com 94). It seems he was not fully aware of the conservation, animal welfare and legal implications of the new regulations when he was responsible for their adoption. He simply took the line of his advisers at the time that Victoria had a

constitutional obligation to fall in line with other states. In particular, South Australia had already allowed the keeping of an extensive list of native species as pets and it was unconstitutional for Victoria to prevent free trade between states.

That South Australia has cut back its field wildlife staff by half since Victoria fell into line with that state is an indication of how the federal legislation for mutual recognition between states, combined with the ill-conceived Section 92 of the Commonwealth Constitution promotes the adoption of the lowest common denominator when it comes to the evolution of State and Territory regulations.

Inconsistencies between States

Fortunately, not all of the worst aspects of wildlife protection that presently exist have yet been adopted by all states. For example, Tasmanian wildlife keepers only require licences for species that are indigenous to that state. When a mainland species reaches Tasmania it can be traded without question.

In some states, such as Western Australia and the ACT, details of past criminal records are not included in applications for wildlife trade licences.

The Northern Territory government has recently allowed a few favoured aviculturists to take birds from the wild in order to generate economic benefits under the guise of pest management. This includes a sub-species of Red-tailed Black Cockatoo (Phillipps, 1994). There are now fears that the 'stamp-collecting' mentality of some aviculturists able to buy these birds will set their sights on the Victorian sub-species of which there are only an estimated 1,000 left in the wild (Pers Com, anonymous Wildlife Officer, 1995).

The so-called "nineteen-bird law" of NSW, a relic from the days when poultry farming and other bird keeping was covered under the same legislation, has traditionally provided a quaint loophole for the illegal laundering of wild birds. "While any person is allowed to keep up to nineteen birds at any one time without a license, thousands of birds could potentially pass through the hands of a trader without question" (Halstead, pers com 1995).

"Variations in legislation from state to state, differences in licensing systems and enforcement practices create problems for overall monitoring of illegal activity and enforcement" (Halstead, B. 1992, page 2).

Lack of Resources

Unfortunately, most other states are consistent with South Australia when it comes to the resources they make available to managing wildlife regulations.

While a host of agencies, including the Australian Customs Service (ACS), Australian Federal Police (AFP) and the Australian Quarantine Inspection Service (AQIS), all play a part in the administration of Commonwealth wildlife regulations, there are very few people actually trained and employed on a full time basis to enforce State and Territory wildlife laws.

Queensland has 2 wildlife task force officers; NSW and Western Australia have 6 and 2 wildlife investigators respectively; while the Northern Territory, an area half the size of Europe, has but 1 'lone ranger' specifically responsible for enforcement of wildlife protection laws.

The under-resourced and over-worked State and Territory wildlife officers are left to tackle the real job of wildlife protection in the field. Other government agencies with the power to assist such as State and Territory police, are usually untrained in the area of wildlife smuggling and trafficking.

Victoria stands out as being the best resourced state, being the only state with an extensive data base on criminal activities relating to wildlife utilisation and exploitation. However, with only 12 specialist enforcement staff to oversee 13,000 wildlife licence holders, let alone deal with the extensive and wide ranging illegal activities relating to wildlife, even Victoria is grossly under-resourced.

Lack of Support

When wildlife officers do uncover rackets within the wildlife possession and trade arena, they rarely get the support needed from other areas of government. For example, wildlife officers have cited occasions when the Australian Quarantine Inspection Service have failed to act on illegal activities even after names, addresses and evidence have been provided directly to them (wildlife officers - pers com anonymous, 1995).

The Australian Wildlife Protection Council has also found AQIS to be less than helpful on a range of wildlife issues. A recent example being the dampening of media interest in the recent decision by France to ban the import of kangaroo meat

after it was revealed that diseased kangaroo meat was being exported to Europe for human consumption.

Imported Wildlife also Threatens Native Wildlife

Another example of AQIS adding to the plight of native wildlife is the fact that it has allowed some 70 new species of parrot and 130 exotic species of finch to enter the country for the pet trade.

Escapees of some exotic finch species have recently established themselves in the wild. While some native finch species have already been displaced throughout large areas of coastal Queensland, AQIS continues to allow the introduction of more species (Bilney, R. pers com, 1995).

In 1994, AQIS allowed several Macaw Parrots with Psittacine Wasting Disease to be imported into Australia. This disease may lie dormant for months or years before a bird shows clinical symptoms and there is no test available to identify carrier birds. The potential impact of this and other diseases on native wildlife and/or the poultry industry is unknown (Phillipps, H. 1994).

Lack of Penalties

Perhaps one of the most frustrating issues associated with illegal activities within the wildlife industry is the fact that crime does pay. If an illegal activity is uncovered and individuals are prosecuted, the penalties associated with the offence amount to little more than petty-cash for the racketeers.

In 1993, the Queensland Stock Squad stumbled upon an illegal wildlife trafficker near Townsville with 260 parrots and finches in transit. While the offender had over $20,000 cash at the time of apprehension and the birds were worth several million on the international market, he was fined $24,000 (Bilney, R. pers com, 1995).

Adding insult to injury, the fine was eventually reduced on appeal to $12,000, being the maximum fine ever imposed in Queensland (Halstead, 1994).

Unfortunately, there are countless examples of specific cases to show that there is big money to be made from illegal wildlife industries. The chances of being caught are remote. "The low level of actual penalties compared with the prices available

for some species means that fines could be considered as a mere tax risk on an otherwise tax-free income" (Halstead, B. 1994, page 9).

Extent of Illegal Activities

That wildlife trade is closely linked to other illegal activities such as drug trafficking is well known. There are even well documented cases of murder within the kangaroo industry (Hoser, R. 1993).

The extent to which organised crime controls Australia's wildlife industry and influences the political and bureaucratic decision-makers however, has never been adequately quantified. Consequently, suggestions that rackets such as meat substitution and illegal trapping of wildlife are all interwoven are easily dismissed as paranoid conspiracy theories.

In 1993 the Federal Attorney General's Office seconded Mr Don McDowell to the Australian Institute of Criminology. He was very close to completing a report entitled 'Australian Wildlife - A Strategic Study into Crime, Policy and Law' when his work abruptly ended, funding for the project was cut and his report stopped from being published (McDowell - pers com, 1995).

As McDowell's report was likely to shed light on the extent of illegal activities in Australia's wildlife industries, the Federal Government had the opportunity to address the conspiracy theory.

Conclusion

To quote one senior state wildlife enforcement officer: "When it comes to wildlife conservation, Australia is still a third world country".

But Australia isn't a developing nation. It is a relatively rich one, with most Australians enjoying a high standard of living. Based on our gross domestic product (GDP), we rate within the top 14 nations of the world.

Australians also take enormous pride in our wildlife heritage. Our native animals appear on our currency, our stamps, our clothing and on our national, sporting and industrial emblems. We are quick to condemn other nations who seem to take wildlife conservation less seriously than we do. We have been particularly unforgiving of those nations which exploit wildlife, firmly opposing the killing of

Canadian Harp Seals and protesting against such nations as Japan who continue to exploit whales and dolphins.

How is it that Australia supports the largest form of wildlife exploitation in the world by way of the kangaroo industry and is rapidly forging the way to having the most diverse range of industries based on wildlife exploitation in the world?

I suggest that while the average Australian is under the impression that the era of "if it moves - shoot it ... if it doesn't - chop it down" is a thing of the past, our State, Territory and Federal governments are still dictated to by that colonial mentality coupled with the modern philosophy of economic rationalism. Our governments play little more than lip service to Australia's pride in its natural heritage while increasingly opening more and more doors to those that can make a quick profit from wildlife under the guise of ESD.

How else can one explain the fact that wildlife laws and regulations vary from State to State, Territory to Territory in spite of repeated calls by the various State and Territory wildlife enforcement officers for national uniformity?

How else can one explain the gross under-resourcing of wildlife agencies responsible for the enforcement of wildlife conservation laws?

How else can one explain that penalties for wildlife smuggling fade into insignificance when compared to the potential profits that can be made?

How else can one explain that industries based on the exploitation of wildlife are subsidised by way of international marketing and below cost royalty charges?

How else can one explain that while we could expect any number of government objectives relating to sustainable agriculture, one of only five objectives listed in the National Strategy for Ecologically Sustainable Development is to "improve kangaroo management at the national level, including the removal of impediments to a sustainable commercial kangaroo industry" (p24).

How else can one explain the fact that Australians who oppose the commercial exploitation of native Australian wildlife are described in 'Commercial Use of Wild Animals in Australia' published by the Federal Department of Primary industry as 'impediments'?

Recommendations

UNIFORM NATIONAL REGULATIONS

MORE RESOURCES FOR WILDLIFE AGENCIES

HIGHER PENALTIES FOR OFFENCES

DNA TESTING COMPULSORY FOR ALL TRADED LIVE WILDLIFE

PUBLISH McDOWELLS' WORK

References

ANZFAS. Fact Sheet - Wildlife Exploitation, February 1995

Eckersley, R. (1990) 'The Concept of Sustainable Development' Paper presented at the workshop on 'Our Common Future' held at the Law School, University of Tasmania July 5-6, 1990

Hale, Peter. 1994. Conservation Through Sustainable Use Of Wildlife - Conference Report. Pacific Conservation Biology 1 (3); 158 -161.

Halstead, Boronia. 1992, Traffic in Flora and Fauna - Trends and Issues No. 41, Australian Institute of Criminology, ACT.

Halstead, Boronia. 1994, Wildlife Legislation in Australia: Trafficking Provisions, Australian Institute of Criminology, ACT.

Hoser, Raymond. 1993, Smuggled - The Underground Trade In Australia's Wildlife, Apollo Books Sydney.

Hoyt, John. 1994, Animals in Peril - How "Sustainable Use" is Wiping Out The World's Wildlife, Humane Society International.

McNeely, J.A. 1988. Economics and Biological Diversity; Developing and Using Economic Incentives to Conserve Biological Resources. IUCN, Gland, Switzerland.

Nias, Raymond, C. 1994, Using It And Loosing It - The Commercial Exploitation of Wildlife In Australia - Draft WWF Australia Discussion Paper and Position Statement , World Wide Fund For Nature.

Phillipps, Hugo. 1994, The RAOU and Bird Trafficking, Wingspan, June 1994. RAOU.

Ramsay, B. 1993, Commercial Use of Wild Animals in Australia, Federal Department of Primary industry.

DEVELOPMENT OF SUSTAINABLE INDUSTRIES BASED ON WILD ANIMALS: A Primary Industry Policy Perspective

by Garry Grant,
Policy Adviser, Rural Policy Branch,
Department of Primary Industries and Energy

Garry Grant has been a policy adviser with the Department of Primary Industries and Energy's Rural Policy Branch, for the past three years. His recent work includes developing policies for sustainable management of Australia's natural resources, one aspect of which has been the sustainable development of the kangaroo industry. He has also held positions with the Australian Fisheries Management Authority and the Australian Bureau of Agricultural and Resource Economics.

Introduction

This paper provides an update on the sustainable use of wildlife from the primary industries policy perspective.

Management of wild animals is a complex issue. This complexity is reflected by the array of around 80 pieces of legislation and regulation relating to the use of native fauna. Industries seeking to utilise wild animals need to operate within these regulations, which of course vary across States and Territories.

There are a wide range of community attitudes regarding commercial use and these attitudes vary depending on the species concerned. For some native species, such as fish, commercial utilisation is well established. Other species which might well be unsuitable for consumptive commercial use, are the subject of other commercial interests like tourism.

Agriculturalists and some government agencies have traditionally regarded many wild animal species primarily as pests. However, the balanced development of wild animal industries offers opportunities to meet objectives cost-effectively for sustainable land management (e.g. management of total grazing pressure), conservation, damage mitigation and farm diversification.

The kangaroo industry is the largest industry using wild animals and has existing and potential linkages at the production and marketing levels to other emerging animal industries. Further, conservation agencies have a large stock of scientific information and experience relating to the management of kangaroos. To ensure that sustainability, conservation and other goals are met, sound scientific and economic information would need to underpin any strategy for development of industries based on wild animals.

The Standing Committee on Agriculture and Resource Management (SCARM) has already recognised that to focus on the impediments and issues relating to kangaroo industry development could well provide broad principles and approaches that could be applicable to other industries. As such the kangaroo industry can be examined as a 'model' for other industries using wildlife, including the use of native flora. More recently, the kangaroo industry has developed its own strategic plan and is now in the process of implementing that plan.

As the Australian and New Zealand Environment and Conservation Council (ANZECC) has legislative responsibilities for the management of kangaroos and other native fauna and flora, SCARM is progressing the development of the policy framework for use of wildlife on a joint basis.

Policy Rationale for Developing Industries based on Wild Animals

Modern agricultural production systems are based on a few highly selected species. While these domesticated species are likely to continue to be the mainstay of Australia's agricultural industries, compelling economic, social and environmental arguments are emerging in support of developing the commercial potential of wild species. Wild animals can be used to diversify and enhance the productivity of farming systems, particularly on lands that are marginal for conventional agriculture.

Incorporating native animals into agricultural production systems makes good economic and environmental sense. Native animals are of course superbly adapted to their natural environment. They have the capacity to survive local environmental extremes such as drought, are resistant to indigenous diseases and parasites, and can yield unique products for profitable niche markets. Developing industries based on native species is one strategy for building the competitive advantage of a nation's rural and associated processing industries.

Besides the commercial incentives for developing the trade in wild animals, there are environmental benefits. Farming and sustainable harvesting of native species are now recognised in international fora and within Australia as potentially powerful tools for ensuring the conservation of species and ecosystems.

This approach involves a transition away from specialisation with a single species, towards multi-species grazing systems that make the best use of the available resource. A feature of such a transition is that it offers the potential for productivity improvements without large increases in inputs. It also offers the prospect of rehabilitating degraded habitats through the adoption of farming systems that are more in tune with the natural environment.

A key requirement in this approach however, is that landholders receive an economic benefit from managing wild animals on their land. At present there is little incentive, most landholders receive no returns for animals such as kangaroos harvested on their land. In effect, landholders have no property rights over the animals. This situation is changing however - landholders in South Australia have recently received a fee from professional shooters for access to kangaroo on their properties.

Australia's opportunities in developing industries based on wild animals are not restricted to native species. Many introduced wild and domestic animals have established large populations, and have significant commercial potential. These introduced species are regarded as pests by some groups and can cause extensive agricultural and environmental damage. Both landowners and government agencies have expended considerable resources to reduce the abundance and distribution of such animals.

Commercial harvesting of these species can make a valuable contribution to more humane and cost effective pest management and/or be one component of an overall strategy to achieve conservation and sustainability goals in a region. However, Australia has traditionally placed greater emphasis on pest control, rather than recognising the resource value of wild animals, and managing them accordingly. The goal of agriculturalists has been to foster industries based on introduced domestic species, rather than capturing opportunities offered by more innovative production systems.

Development of new industries based on wild native and introduced animals could generate significant economic, social and environmental benefits for rural

communities and help in achieving broader goals of ecologically sustainable development.

Commercial Development of Wildlife Industries within a Conservation Framework

Long-term conservation of native plants and animals ultimately depends on the conservation of natural ecosystems. The traditional approach to wildlife conservation in developed countries has been to set aside land as national parks or conservation reserves. However, the supply of suitable land is limited and the costs of acquiring the land and managing it can be high. There is also some doubt that the areas already set aside for conservation are large enough to sustain some species and ecosystems. On the other hand, a huge variety and quantity of indigenous genetic resources are held on private lands outside of national parks.

A major challenge in conservation policy is therefore to ensure the conservation of wildlife and natural ecosystems outside reserves.

The retention and maintenance of natural habitat on agricultural and pastoral land is dependent on the attitudes and land use practices of individual landholders. Much of Australia's land is used for agricultural and grazing purposes. The international trade in farm products is very competitive, with farmers under enormous economic pressure to increase productivity and profitability.

The need to involve landowners in the conservation and management of biological diversity is now recognised. Most importantly, sustainable use of wildlife is now widely acknowledged as a key strategy to encourage landowners to consider the environmental implications of their management decisions.

The International Union for the Conservation of Nature and Natural Resources (IUCN) has had an important role in the development of policy for sustainable use of wildlife.

The World Conservation Strategy was prepared by the IUCN (IUCN 1980) with the support of the United Nations Environment Program, the World Wildlife Fund, the Food and Agriculture Organisation of the United Nations (FAO) and the United Nations Educational Scientific and Cultural Organisation (UNESCO).

The World Conservation Strategy defines conservation as:

"...the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations".

The Strategy recognises that sustainable use of species is compatible with conservation, and sets out three explicit objectives in resource conservation:

- to maintain essential ecological processes and life-support systems on which human survival and development depend;
- to preserve genetic diversity; and
- to ensure the sustainable utilisation of species and ecosystems.

These objectives have been incorporated into Australia's National Conservation Strategy.

Integrating native plants and animals into the farm production system is an important way of diversifying the economic base in an ecologically sustainable way. In the longer term, it could also provide an incentive for farmers to protect and re-establish natural habitats.

Only a few species of wildlife are likely to have attributes that make them attractive for commercial use. In Australia, the large kangaroos are a good example of species with commercial potential. Kangaroo populations are abundant and widespread over many ecosystems, have a high rate of increase when conditions are favourable, are well adapted to the harsh and variable environment of inland Australia, and produce unique high quality meat and skin products. As a species they have gained significant benefit from changes due to human activities.

The positive conservation implications associated with managing kangaroos as a renewable resource were formally acknowledged in September 1990 by the then Council of Nature Conservation Ministers. The Council endorsed the following as a third objective to the National Guidelines for Kangaroo Management: *"where possible, to manage kangaroo species as a renewable natural resource providing the conservation of the species is not compromised".*

In 1992 this new objective was implemented into kangaroo management programs in Queensland, New South Wales and Western Australia.

The importance of sustainable use of kangaroos to conservation was recognised at the highest level when the Council of Australian Governments endorsed the National Strategy for Ecologically Sustainable Development in December 1992 (Commonwealth of Australia, 1992).

Objective 1.4 of the Strategy is:

"to improve kangaroo management at the national level, including the removal of impediments to a sustainable commercial kangaroo industry".

In achieving this goal, it was agreed that Governments will:

"work towards an integrated, and coordinated kangaroo management strategy which is based on development of national guidelines for kangaroo management, the use of market mechanisms such as individual tradeable quotas and the early finalisation of National Game Meat Standards".

These policy directions offer exciting prospects for conservation off-reserves and for the development of new industries based on the sustainable use of native species.

Key Issues and Impediments influencing the development of wild animal industries

The Bureau of Resource Sciences report, *Commercial Use of Wild Animals* (Ramsay 1994), identified a range of impediments and issues facing industries based on wild animals. The report found that the greatest challenge facing the development of wild animal industries in Australia is to change past attitudes and to recognise that wild animals are potentially profitable supplements and alternatives to domestic animal production. Furthermore, wild animal industries can be managed as part of an ecologically sustainable system that meets the conservation aims for native wildlife. Institutional and legislative impediments have also been identified as major issues impeding the development of wild animal industries.

The Role of Government in the Development of these Industries

Whilst governments have had a major involvement in conservation policy relating to wildlife, in a commercial sense, wildlife use in Australia has developed

with minimal government involvement, and has been largely driven by economic considerations.

Although a variety of species are used, there are many linkages between the industries concerned, with industries often sharing opportunities and impediments to development. A holistic approach is required to draw together the various management objectives (conservation, renewable resource, damage mitigation); build the links between industries; and provide the policy settings to bring new industries into mainstream agriculture and conservation.

Use of wild animals is a complex and at times controversial issue, with a wide range of stakeholders. Therefore, development of industry policies and strategies should take in a consultative manner with the various groups.

ARMCANZ Ministers have agreed to take a proactive approach to bring about the development of sustainable industries based on the utilisation of native and introduced wild animals. A proactive approach is appropriate as:

- the industries are small, have limited resources and lack cohesion and direction. Transfer of information on industry opportunities and threats is poor. A passive approach is unlikely to resolve the problem of fragmentation and lack of industry momentum.

- there is a case for encouraging collaboration between and within industries on issues such as research and development, processing, product development and marketing to address the problem of 'free riders'. This refers to the situation where individuals can benefit from the actions of others without contributing. This is a particular problem in the areas of marketing and research and development, and is quite evident in some wild animal industries. There are many production and marketing linkages between wild animal industries, and the free rider effect can also occur between industries.

- rural industry and conservation policy objectives are unlikely to be met if a passive approach is taken by industry and government. To maintain and increase the international competitiveness of rural industries in the long term, it will be necessary to diversify the agricultural base, increase productivity and encourage ecologically sustainable development. These broad goals underpin the explicit objective in the National Strategy for

Ecologically Sustainable Development to remove impediments to a sustainable kangaroo industry.

The Government's preference is for a market-led approach which draws on the lessons learnt from the successes and failures of the more traditional primary industries. Such an approach is consistent with the overall move towards self reliance and improved risk and business management in rural industries.

The role of Government is essentially one of ensuring that the operating environment of businesses is conducive to industry development, yet also ensuring that the resource base is not over-exploited. In this sense, there are limitations on the degree of industry self-regulation that may be appropriate. Commercial development would need to be underpinned by conservation principles, within a humane and ecologically sustainable framework.

The Government also has important roles in facilitation, coordination and strategy development. For example, Governments can help these industries to develop new regimes to ensure that quality and hygiene are maintained.

Progress to Date

There have been various initiatives over several years to refine approaches to sustainable use of wild animals. Three recent developments which have major implications for the approach of industry and government to the development of industries based on wild native and introduced animals, are:

i) Governments made a specific commitment in Objective 1.4 of the National Strategy for Ecologically Sustainable Development to develop a sustainable kangaroo industry (Commonwealth 1992).

ii) ARMCANZ Ministers have taken a proactive approach to development of industries based on wild native and introduced animals. Ministers supported the convening of a national workshop involving a wide range of stakeholders to identify administrative and institutional impediments to the development of these industries (DPIE 1993).

iii) The Kangaroo Industries Association of Australia has developed a strategic plan for the kangaroo industry (KIAA 1995), to responsibly manage its future growth. This process has been facilitated by the DPIE Agribusiness Programs and by a joint ARMCANZ/ANZECC/industry contact group.

There are several broader activities now underway that are directly relevant to the development of policies for the use of wild animals:

i) the ANZECC Task Force on Sustainable Use of Wildlife now includes representation from ARMCANZ, and this is likely to evolve as a joint ANZECC/ARMCANZ taskforce.

ii) use of wild animal resources is an element of the draft Aboriginal and Torres Strait Islander Commission Rural Industries Strategy, developed by the Rural Industries Advisory Committee (ATSIC 1994).

iii) a joint ARMCANZ/ANZECC working group is currently developing a draft National Rangeland Management Strategy and Action Plan. Sustainable use and management of kangaroos and other wild animals is an issue that is being considered in the process of developing the strategy.

Conclusion

The balanced development of wild animal industries, such as the kangaroo industry, could generate employment and economic activity in rural areas, while meeting other objectives such as conservation, animal welfare and cost effective pest management.

The challenge for this seminar, which commences with an emotive title: "sustainable use of wildlife; utopian dream or unrealistic nightmare", is to recognise that it is a question of neither.

Significant progress towards the sustainable use of wildlife has occurred. Industries such as the commercial kangaroo industry are displaying higher levels of professionalism with a focus on producing quality products for domestic and export markets, while meeting conservation objectives.

Across several rangeland regions, wild animal management is a significant issue due to their contribution to total grazing pressure. There are encouraging initiatives progressing, in areas such as the south west of Queensland (QDPI 1993) and the Western Division of NSW (CALM 1993) which have recognised the opportunities to develop the potential resource value of these wild animals for diversification of existing production systems and to achieve broader conservation goals.

Such outcomes are best achieved through an holistic policy approach which is consistent across States, yet allows sufficient flexibility to select the most appropriate management option for the particular circumstances. This will continue to require coordinated action by ARMCANZ and ANZECC working with industry.

* *This paper draws on a paper prepared for the Sustainable Resource Management Committee by Garry Grant and Brian Ramsay, Rural Division, Department of Primary Industries and Energy.*

Bibliography

International Union for the Conservation of Nature and Natural Resources
World Conservation Strategy: living resource conservation for sustainable development prepared by the International Union for the Conservation of Nature and Natural Resources (IUCN) with the United Nations Environment Programme (UNEP) and the World Wildlife Fund (WWF)
Morges, Switzerland, 1980

National Strategy for Ecologically Sustainable Development
Commonwealth of Australia
Australian Government Publishing Service, 1992

Brian J. Ramsay
Commercial use of wild animals in Australia
Bureau of Resource Sciences
Australian Government Publishing Service, 1994

G.D. Grant and B.J. Ramsay (eds)
Workshop on Kangaroo Management: Removal of impediments to a sustainable commercial Kangaroo Industry, Adelaide, 21-22 July 1993
Department of Primary Industries and Energy, 1993

Draft National Aboriginal and Torres Strait Islander Rural Industry Strategy
Aboriginal and Torres Strait Islander Commission, 1994

Department of Conservation and Land Management
A proposed integrated regional adjustment and recovery program for the Western Division of New South Wales
Western Lands Advisory Board Discussion Paper, 1993

South West Queensland Project, a blueprint for addressing the economic, social and ecological problems
Queensland Department of Primary Industries, 1993

Kangaroo Industry Association of Australia
National Kangaroo Industry Strategy
Macarthur Consulting, 1995

NSW NATIONAL PARKS & WILDLIFE SERVICE UPDATE

by Alastair Howard,
Executive Director, Operations,
NSW National Parks & Wildlife Service

Alastair Howard joined the Service in 1972 as a Ranger in Kosciusko National Park, and over the next 23 years gained experience in the many diverse natural areas covered by the national parks of NSW. In 1990, after 8 years as Western Region Manager, he was appointed to his present position. His responsibilities include the direction and leadership of the NSW National Parks and Wildlife Service with particular emphasis on the efficient and effective management and operation of the State's park and reserve and wildlife management systems.

Introduction

For many years there has been continuing, and increasing, conflict, within Australia, between those who support the sustainable use of wildlife and those who feel that such exploitation is wrong. As the agency of the New South Wales Government with primary responsibility for conservation of nature in this state, the NSW National Parks and Wildlife Service often becomes a focal point in this conflict.

The Service's conservation responsibilities are prescribed by the National Parks and Wildlife Act, 1974 and its Regulations, together with the provisions of the Wilderness Act, 1987. The National Parks and Wildlife (Fauna Protection) Regulation, 1994 and the National Parks and Wildlife (Land Management) Regulation, 1995 provide the mechanisms for implementation of some of the Service's legislative responsibilities.

Further clarification is given to these legislative responsibilities through the formulation and adoption of Service policies and procedures.

The legislation, and policies, are reviewed regularly to ensure that the Service is able to meet its statutory responsibilities. The Subordinate Legislation Act requires that all regulations be reviewed every five years. This review process involves public exhibition of proposed amended regulations together with a regulatory

impact statement which assesses the social and economic impacts of the relevant regulation.

The NPW Act provides mechanisms for licensing the use of wildlife, with specific provisions relating to the taking, killing, picking, holding and dealing in wildlife and wildlife products.

These provisions provide the Service with the capacity to regulate and monitor activities such as:

- culling of protected animals to mitigate damage to property and crops;
- scientific research on wildlife;
- picking and growing protected native plants;
- game hunting during declared open seasons;
- commercial trade in wildlife or wildlife products;
- farming of protected fauna;
- private holding of protected fauna, including those held for rehabilitation by wildlife carer groups; and
- restricting and/or placing conditions on forestry activities or other developmental projects where they impact upon endangered fauna.

The Service's management of these types of activities involves wide ranging reaction in the community. In determining its policies in these areas the Service is always mindful of its nature conservation role and responsibilities. Policies are only determined after careful consideration of all available information.

The wildlife management issues which seem to attract the most interest and/or criticism include:

Kangaroo Management

Kangaroo management in New South Wales has four aims which are stated in the gazetted management plan for 1995 to 1997 as:

1. to maintain viable populations of Red Kangaroos, Western Grey Kangaroos, Eastern Grey Kangaroos and Wallaroos throughout their natural range;

2. to minimise the adverse effects that certain densities these four species may have on rangelands, on pastoral and agricultural production and other land uses;

3. to maintain populations in these areas at levels which will not, in the long term, adversely affect these habitats; and

4. where possible, manage the species as a renewable resource, providing conservation of the species is not compromised.

These aims form the Service's policy position for the management of the four kangaroo species identified in the plan and they are, although some may argue otherwise, clearly focused on a conservation programme which has provisions for damage mitigation and sustainable use.

Whilst there has been considerable ongoing debate over the effectiveness and efficacy of the Service's kangaroo management programme, the evidence shows that despite these concerns, populations of the four species continues to grow. Latest figures deriving from the annual aerial survey of management zones conducted in June and July 1995 indicate a 4% increase in both red and grey kangaroos across the area surveyed. The 1995 red and grey kangaroo combined population for NSW is now estimated at 6.2 million compared with 5.96 million for 1994.

Emu Farming

Emu farming is in its infancy in New South Wales.

In 1991 the NSW Pure Food Regulation was amended to include emu meat in the definition of poultry thus allowing its sale for human consumption.

In 1993 the State government introduced legislation to enable commercial farming of emus from captive bred stock.

To assist in establishing the industry and to increase genetic diversity in the breeding flocks, the government allowed the first group of licensees (prior to October 1993) to each take up to 50 chicks from the wild.

A total of 3,107 birds were legally taken from the wild and each of them was microchipped by the Service for future identification purposes. Each of these birds remain the property of the Crown and they cannot be killed and processed for international trade.

A further 10,000 captive-bred birds were purchased from interstate breeders and together with the legally taken wild caught NSW birds form the core breeding stock in this state.

Emu breeders - there are currently 142 farms in NSW - are licensed under the National Parks and Wildlife Act and the Service employs a full-time officer to undertake associated administrative, monitoring and liaison functions. The position is fully funded by licence fee income.

The Service is not involved in the promotion or marketing of emus or emu products derived from emu farms.

Because of the unmarketability of damaged skins or poor quality meat from wild birds by comparison to farmed animals, the Service believes that the emu farming industry poses no threat to the survival of wild populations of emus throughout their range.

There has been no discernable increase in offences relating to emus following the introduction of emu farming.

Waterfowl Management

The management of waterfowl falls into two categories:

1. damage mitigation; and
2. recreational shooting

Damage caused by waterfowl to rice crops in southern NSW can be a major wildlife problem for the Service during the September to January growing season. Where alternative methods to minimise damage caused by waterfowl are not successful, the Service will issue rice growers and others licences to shoot waterfowl over the rice fields.

In some circles this action is seen as authorising a de facto duck open season. The Service has responded to this concern and has introduced a number of changes to its management program for 1995/96.

These changes include:

1. the replacement of the agency system for issue of shooters licences by a centralised system to be managed by the Service's Griffith District Office;

2. the requirement for shooters licence applications to be in writing on an approved application form;

3. the requirement for applicants for shooters licences to have passed a Waterfowl Identification Test; and

4. the increasing of shooters licence fees from $10 to $35 to meet additional administrative costs, increased law enforcement effort and to fund research to quantify the damage done to rice crops by waterfowl.

The second category, that of recreational shooting, evokes considerable emotion and debate.

Statistical analyses have shown that most annual variation in indices of game duck numbers can be explained by rainfall variation. All available scientific evidence indicates that there is no effect from recreational hunting on the conservation status of game species.

The National Parks and Wildlife Act makes provision for the Minister to declare open seasons for hunting protected fauna. The Service uses results of annual, comprehensive aerial surveys for determining waterfowl population trends and dispersal over south-eastern Australia in making recommendations to the Minister on the likely conservation impact of an open season on waterfowl.

Ultimately, the question of whether there should or should not be an open season on waterfowl becomes one of community acceptability.

Bird Keeping and Trading Licences

All native birds have protected status in New South Wales and cannot be legally taken from the wild except under certain, specified, circumstances.

The current so called 19 bird rule, under section 108 of the National Parks and Wildlife Act allows any person to hold up to 19 protected or endangered birds without the knowledge of the Service. Since the mid 1980s the Service has sought to have this section of the Act repealed to enable the introduction of an avicultural

licensing system which would give a much improved ability to monitor and regulate the holding and trade of birds of conservation concern.

This NSW law has been widely criticised by the NSW judiciary and interstate and Federal authorities because it facilitates dealing in illegally trapped or stolen birds. No similar provisions to the 19 bird rule exist in the fauna protection laws of any other Australian state or territory.

The Service has proposed to the Minister for the Environment that this provision be repealed and that new aviculture licensing provisions be introduced. The Service's preferred option for a new licensing system is an extended exempt (from licensing) list and three tiers of licence for keepers related to possible impacts or aviculture on wild populations.

In drafting suggested species lists for the various categories, the Service has been mindful of the fact that there are already nearly half a million birds in the registered system in this state and it is likely that a similar number of unregistered but potentially registrable birds are currently held under the "19 bird rule".

Species identified as possible additions to the current exempt species list fall into the same class as Budgerigars, Cockatiels, Diamond Doves, Zebra Finches and all the other species which have been exempt from licensing restrictions for the past decade or so.

The species suggested for exemption have been particularly successful in aviculture as captive breeders and have huge captive populations. They are easy to keep and have a low commercial value so there would be little incentive for illegal trapping.

Regulatory and monitoring capabilities will be improved and better prioritised by a tiered system because the species of most concern will not be overshadowed by species which are very common in aviculture and at minimal risk of illegal exploitation in the wild.

It must be appreciated that very few species are now, or have ever been seriously threatened in the wild by aviculture.
Similar licensing systems are under consideration for reptiles and amphibians.

The Service is of the view that a proactive monitoring and enforcement system has superior conservation advantages over reactive enforcement of prohibitive laws.

Summary

I have only touched on a few areas where community concerns and conflicts can arise as a result of differing views on the use of wildlife.

I have not addressed the area of native plant harvesting where licences are required to pick or grow native plants commercially. The present system has largely been rendered unworkable as a consequence of modern nursery practices and is therefore in need of review.

As we focus on the current debate over sustainable use of wildlife we would do well to reflect on the well documented threatening processes that have wrought dramatic changes on the natural environment of New South Wales over the last 207 years. Processes such as habitat loss and fragmentation, habitat degredation and introduced species have had and continue to have a significant effect on the viability of native species. Whilst direct exploitation such as hunting and poaching have contributed in the past to loss of species they are no longer as significant as these other factors.

The community has much to treasure in the remaining diversity of plants and animals in this state. The Service's role in conservation is concerned with the management of these, and other aspects of our heritage in the public interest, and includes, as both a community value and responsibility, the protection and preservation of those elements the community wants to retain for its use and enjoyment.

No one agency can, by itself, successfully pursue the conservation of nature in this state. There are many organisations both within and outside government that have or seek to have a role in that endeavour. It is the community itself, however, that has the key role in that it ultimately decides what is of value in our natural world and in our cultural life, and has a major influence and part to play in how these things are managed.

Conservation is a community concern, and the appreciation of these values and of our collective and individual responsibilities is central to its success.

SUSTAINABLE USE OF WILDLIFE:
Utopian Dream or Unrealistic Nightmare?

Session B

CONSUMPTIVE USAGE OF INDIGENOUS WILDLIFE

AUSTRALIAN WILDLIFE: CURRENT AND POTENTIAL CONSUMPTIVE USES AND THEIR BENEFITS

by Michael Vardon,
Wildlife Management International Pty Ltd,
Karama, Northern Territory

Michael Vardon is a Research Associate with Wildlife Management International. He is also studying towards a PhD at the School of Resource and Environmental Management at the Australian National University where he gained his Masters in Flying-fox management. He has worked on wildlife management problems in the both the Northern Territory and South East Asia.

Introduction

Nationally and internationally there is a growing but cautious acceptance of sustainable use of wildlife as a conservation tool (eg. McNeely et al. 1990; Nias 1995; Freese 1994; Bissonette and Krausman 1995; Grigg et al. 1995; Webb 1995). The International Union for the Conservation of Nature (IUCN), World Wildlife Fund (WWF) and the Convention on International Trade of Endangered Species of Wild Fauna and Flora (CITES), all acknowledge its usefulness in certain circumstances.

Many people remain sceptical about the approach. This is not surprising given that the economic values of wildlife have resulted in unsustainable use of many species in the past. However, the adoption or consideration of the sustainable use conservation strategy, which utilises economic values, does not in any way diminish non-economic wildlife values or reduce the importance of National Parks and other conservation reserves.

Wildlife uses and values

Wild species are used for a variety of purposes: food, hides, pets, recreation, ceremony, medicine and decoration. The uses of wildlife, whether they be consumptive or otherwise, reflect a diversity of values - economic, spiritual, social and environmental. Not all of these values are compatible or positive (Vardon and Webb 1996). For example, pest species have a negative value to many primary

producers, but to other people they do not. Feral species, although wild, are generally considered to have a lower value than native ones.

Value is an important issue in conservation as for anything to be conserved it has to be worth conserving (Webb and Vardon 1996). This applies to more than just wildlife. Wildlife must compete with other human needs when decisions are made that directly or indirectly affect it.

The philosophical objections to wildlife use, which are based on different perceived values, should be clearly separated from any debate that concerns the biological and economic aspects of use. Many at this conference will argue that the use of wildlife is unethical or immoral. Some will even say the use of domesticated animals is the same. I dispute both. It is no more wrong to eat rice than it is cattle: they both require native habitats to be destroyed. Indigenous people are not acting immorally when they hunt and eat dugong, turtle, or goanna.

Current and potential wildlife consumption in Australia

Indigenous Australians have consumed and continue to consume native and feral species to support themselves and their culture. They have sustained the use of wildlife for 40,000 years or more (eg. Altman 1987). Other Australians use wildlife for a variety of reasons: food, other products, recreation and pets. Uses range from subsistence to commercial operations.

Many wild animal species are used commercially in Australia (**Table 1**). The definition of wild species is not universal. Here I use wild species to mean: (1) any species, regardless of its origin, that exists in the wild in Australia (e.g. rabbits), and, (2) a species native to Australia but taken from its natural habitat by non-indigenous people (e.g. emus, cockatoos).

Other animals have direct economic value and sustainable use programs may assist their conservation (**Table 2**). Many plants are also used but I have been asked to address animal use only. Suffice to say that the sustainable use of plants presents similar problems to those of animals.

Table 1. Wild animals used commercially in Australia. Sources: ANCA (unpublished), Wilson et al. (1992), Ramsey (1994) and Grigg et al. (1995).

Native	Exotic
Wallaby	Rabbit
Kangaroo	Pig
Possum	Goat
Crocodile	Camel
Emu	Horse
Magpie-goose	Buffalo
Mutton Bird	Cane Toad
Other water fowl	Fox
Cockatoos and Parrots	Hare
Shellfish	
Freshwater fish	
Freshwater turtles	
Reptiles	

Table 2. Wild animals with potential for commercial use. Sources: WMI (unpublished), Wilson et al. (1992), Kennett (1994), Kingwell (1994), Grigg et al. (1995)

Marine turtles	Flying-foxes
Goannas	Other reptiles
Some snakes	Pigeons and quails
Cockatoos and Parrots	Some raptors
Freshwater turtles	

Harnessing uses and values to benefit conservation

It makes sense, if you want to conserve as much wildlife as possible, to use all values, including economic ones, to achieve this. To date conservation in Australia and in other parts of the world has largely ignored economic values. This has limited conservation options, particularly where wildlife conservation must compete directly with other land uses. On private land and other areas where the land and its species, whether natural or not, are expected to provide directly for the needs of humans, conservation is a luxury that few can afford.

Conservation on private land is important since some two-thirds of Australia is under private management. National Parks and other protected areas, the flagships of conservation, cover around one-twentieth (Ford and Barrett 1995). That more attention needs to be paid to conservation on private land is generally recognised (eg. Saunders 1994; Bridgewater and Walton 1996; Ford and Barrett 1995). Achieving this, however, has proved problematic.

In Australia, native vegetation was cleared at a rate of 500,000 ha per year between 1983 and 1993 (Glanznig 1995), despite its known detrimental effects on the environment. Clearing is undertaken for economic reasons and may destroy many areas of great importance to certain species.

In the Northern Territory, a nesting habitat of the Red-tailed Black Cockatoo was cleared for rice production in 1994. If the landowner had been able to realise the value of even a small proportion of the Cockatoo eggs and/or nestlings that occurred in this area, then there would have been an economic reason to keep the habitat intact. The average net return for rice production in the area is around $150 per ha (Murti 1992), while the market demand for the Red-tailed Black Cockatoo is strong (Kingwell 1994). Even payment of $100 per egg for just two eggs per hectare would provide a more viable economic alternative than rice.

Large-scale clearing in the Northern Territory is planned for the Douglas-Daly Rivers region. Natural habitat will be lost to cotton, rice, mangoes, cashews and other exotic produce.

Land-use alternatives

Providing land-use alternatives is the basis of sustainable use of wildlife. When properly managed, sustainable use can meet conservation objectives on private land, at low cost to governments. The theoretical and practical base for sustainable use of wildlife is now well developed (eg. Walters 1986; McNeely et al. 1990; Kiss 1990; Hawley 1993; Robinson and Redford 1991; Caughley and Sinclair 1994; Grigg et al. 1995). This is often ignored by those opposed to wildlife use. Some examples of sustainable use are:

In Zimbabwe the CAMPFIRE (Communal Areas Management Program for Indigenous Resources) project and private land owners harvest elephants and other species (Kiss 1990). Elephant numbers are stable (Barbier et al. 1990) and some 6% of agricultural land is now being given back to wildlife annually,

because it is a more economically valuable use of land (Rowan Martin, pers. comm).

Parrot harvesting in Suriname, South America forms part of the government's conservation strategy (Thomsen and Brautigam 1991). Twenty-one of the most abundant parrot species are harvested. Suriname currently has one of the world's lowest rates of forest destruction (<1% per annum) and the scheme curbed illegal harvesting, generated around A$350,000 in the first year of operation and placed increased value on natural habitats.

In the Northern Territory of Australia, crocodile numbers have risen under a management scheme that sees the harvest of around 13,000 crocodile eggs annually. What was once shot indiscriminately as vermin or for quick profit is now a long-term asset (Webb and Manolis 1993). Landowners are prepared to tolerate some predation on livestock by crocodiles and to consider them when making land-use decisions because they receive financial rewards for maintaining nesting habitat. A great deal of information has been collected about the species involved and the annual monitoring program, which involves the aerial survey of 70 sections of Northern Territory rivers and a boat survey of four river systems (see Webb and Manolis 1992), ensures that changes in relative abundance can be detected and corrective action applied should any dramatic declines occur. The management program has been accepted by the Commonwealth Government and internationally by CITES.

The benefits of the use of crocodiles could be even greater if safari style hunting of crocodiles was permitted. This would be compatible with their CITES listing.

Hunting, in whatever form, is one of the most controversial uses of wildlife. Yet, because of it much research has been devoted to game species and their conservation, particularly in North America. In the USA, duck hunters contribute $US288 million annually and have two million hectares of wetlands in private reserves (Sparrow et al. 1989). This area is in addition to public hunting reserves.

The conservation of wetlands is an international issue since many have been destroyed, "reclaimed" for urban development or converted to aquaculture. The use of crocodiles and waterfowl adds another reason to conserve these habitats.

Conclusion

Many species are already being used commercially in Australia and overseas. Conservation benefits can result from these. Many other species also have economic values which may be harnessed to generate conservation benefits, particularly on private land. Past experiences, successes and failures alike, should be carefully examined and used in conjunction with scientific methods to ensure the achievement of conservation objectives from sustainable use programs.

Acknowledgements

The support of Wildlife Management International Pty. Limited, the Conservation Commission of the Northern Territory, The Bureau of Resource Sciences and the Australian National University for studies into wildlife conservation and the sustainable use of natural resources is gratefully received. Chris Tidemann and Grahame Webb kindly read this manuscript.

References

Altman, J.C. (1987). "Hunter-gathers today: an Aboriginal economy in North Australia". Australian Institute for Aboriginal Studies: Canberra.

Barbier, E.B., Burgess, J.C., Swanson, T.M. and Pearce, D.W. (1990). "Elephants, Economics and Ivory". Earthscan: London.

Bissonette, J.A. and Krausman, P.R. (Eds.). (1995). "Intergrating People and Wildlife for a Sustainable Future". The Wildlife Society: Bethesda.

Bridgewater, P. and Walton, D.W. (1996). Towards a framework for vertebrate conservation. In "Proceedings of the First Conference on Eastern Indo-Australian Vertebrates", ed. by D.J. Kitchner and A. Suyanto. Manado, November 1994. WA Museum, Perth..

Caughley, G. and Sinclair, A.R.E. (1994). "Wildlife Ecology and Management". Blackmore: Ann Arbor.

Ford, H.A. and Barrett, G. (1995). The role of birds and their conservation in agricultural systems. In "People and Nature Conservation: Perspectives on Private Land Use and Endangered Species Recovery", ed. by A. Bennett, G. Backhouse and T. Clarke. Transactions of the Royal Zoological Society of NSW: Sydney.

Freese, C. (1994). "The Commercial, Consumptive Use of Wild Species: Implications for Biodiversity Conservation". WWF International: Washington DC.

Glanznig, A. (1995). Native vegetation clearance, habitat loss and biodiversity decline. Biodiversity Series, Paper No. 6. Biodiversity Unit, Department of Environment, Sport and Territories: Canberra.

Grigg, G., Hale, P. and Lunney, D. (Eds.). (1995). "Conservation Through Sustainable Use of Wildlife". Centre for Conservation Biology: Brisbane.

Hawley, A.W.L. (1993). "Commercialisation and Wildlife Management: Dancing with the Devil". Krieger: Malabar.

Kennett, R. (1994). A proposed commercial trade in turtle shell artefacts by Aboriginal people in the Northern Territory. Wildlife Research-CCNT: Darwin

Kingwell, R.S. (1994). Should Australia Export Its Native Birds? *Review of Marketing and Agricultural Economics*. 62: 261-271.

Kiss, A. (1990). "Living with Wildlife: Wildlife Resource Management with Local Participation in Africa". World Bank: Washington DC.

McNeely, J.A., Miller, K.R., Reid, W.V., Mittermeier, R.A. and Werner, T.B. (1990). "Conserving the World's Biological Diversity". IUCN: Gland, Switzerland.

Murti, S. (1992). Gross Margin Budgets for Field Crops in the Douglas-Daly Region 1992-93. Technical Bulletin No. 196. Department of Primary Industry and Fisheries: Darwin.

Nias, R.C. (1995). Using it and losing it - the commercial exploitation of wildlife in Australia. WWF Australia Discussion Paper and Position Statement. WWF (Aust.): Sydney.

Ramsay, B.J. (1994). "Commercial Use of Wild Animals". Bureau of Resource Science-AGPS: Canberra.

Robinson, J.G. and Redford, K.H., (Ed.) (1991). "Neotropical Wildlife Use and Conservation". University of Chicago Press: Chicago.

Saunders, D.A. (1994). Can we integrate nature conservation with agricultural production? *Landscape and Urban Planning* 28: 63-71.

Sparrowe, R.D., Dwyer, T.J., Poulos, P.G., Jahn, L.R., Smith, D.M. and Misso, R.J. (1989). Biopolitical strategies for waterfowl habitat preservation and enhancement. In "Habitat Management for Migrating and Wintering Waterfowl in North America", ed. by L.M. Smith, R.L. Pedeerson and R.M. Kaminiski. Texas Tech. University Press: Texas.

Thomsen, J.B. and Brautigam, A. (1991). Sustainable use of neotropical parrots. In "Neotropical Wildlife Use and Conservation", ed. by J.G. Robinson and K.H. Redford. University of Chicago Press: Chicago.

Vardon, M.J., Missi, C. and Cleary, M. (1996). Commercial wildlife use: potential benefits and opportunities for indigenous Australians. In "Proceedings of the Ecopolitics IX Conference", ed. by R. Sultan. Darwin, 1-3 September 1995. Northern Land Council: Darwin.

Walters, C. (1986). "Adaptive Management of Renewable Resources". McGraw-Hill: New York.

Webb, G.J.W. (1995). The links between wildlife conservation and sustainable use. In "Conservation Through Sustainable Use of Wildlife", ed. by G. Grigg, P. Hale and D. Lunney. Centre for Conservation Biology: Brisbane.

Webb, G.J.W. and Manolis, S.C. (1992). Monitoring Saltwater Crocodiles (Crocodylus porosus) in the Northern Territory of Australia. In "Wildlife 2001: Populations", ed. by D.R. McCullough and R.H. Barrett. Elsevier: London.

Webb, G.J.W. and Manolis, S.C. (1993). Conserving Australia's crocodiles through commercial incentives. In "Herpetology in Australia: A Diverse Discipline", ed. by D. Lunney and D. Ayers. Transactions of Royal Zoological Society of New South Wales: Sydney.

Webb, G.J.W. and Vardon, M.J. (1996). Conservation through sustainable use: a discussion of concepts and guidelines for use. In "Proceedings of the First Conference on Eastern Indo-Australian Vertebrates", ed. by D.J. Kitchner and A. Suyanto. Manado, November 1994. WA Museum, Perth.

Wilson, G., McNee, A. and Platts, P. (1992). "Wild Animal Resources: their use by Aboriginal Communities". AGPS: Canberra.

SUSTAINABLE USE OF WILDLIFE

by Jamie Pittock,
Conservation Officer,
World Wide Fund for Nature (Australia)

After training in zoology and geography, Jamie Pittock worked for several years for Victorian-based environment groups on a range of conservation policies and projects. From 1992-1994 he worked for the Environment Centre NT (Darwin) where he was primarily involved in Landcare and Rangeland Management issues. He also helped set up the Arid Lands Coalition of environment groups. Since 1994, Jamie has worked for the World Wide Fund for Nature in Sydney as manager of the Australian nature conservation program and Threatened Species Network. His key activities include: promotion of vegetation conservation and protection; development and supervision of projects to conserve remnant native grasslands, wetlands, woodlands and threatened species; and work to conserve rangeland ecosystems in Western NSW.

Overview

The World Wide Fund for Nature (WWF) is not opposed to the sustainable use of wildlife. Indeed around the world, WWF funds many projects that seek to achieve the sustainable use of plants and animals. Our policy is detailed by Ray Nias (elsewhere in this volume). WWF's policy is that wildlife use proponents must demonstrate a net conservation benefit from proposed use of wildlife. This is often a difficult task but we believe a reasonable expectation of proponents in the Australian context.

We are sceptical of the claimed benefits of wildlife use given the poor record of major wildlife industries in Australia. For instance, the history of the fishing and timber industries in Australia is primarily of over-exploitation, waste, and excessive environmental damage. With some exceptions, the fisheries and forestry sectors do not engender confidence that Australia's governments and industry are yet mature enough to manage new wildlife use industries.

In this paper I will:

1. Outline what WWF considers to be an adequate system for new wildlife use proposals to proceed;

2. Examine some claimed benefits from wildlife use programs; and

3. Comment on some issues wildlife use proponents often ignore.

A 'good' system

WWF considers that for wildlife use to be well managed, it requires extensive investment in:

1. Ecological research so the biology and ecology of the exploited species and their habitat are known and limits identified;

2. Licensing of industry participants;

3. Monitoring wild populations of target species to identify and mitigate any unacceptable impacts;

4. Enforcement of limits on trade, particularly illegal activities masked by legal trade; and

5. Accountability so that the wildlife trade occurs in a transparent manner, and with full cost recovery mechanisms.

Even a cursory assessment of the costs of establishing such a system indicates that it is very expensive:

- **Ecological research**
  In the case of the endangered Gouldian Finch of northern Australia, which was widely trapped for the pet trade until the 1970s, over $2 million has been spent on research into threatening processes since the mid-1980s. Despite many theories, there is still no conclusive explanation for their decline sufficient to reverse the threatening process or processes. The long lifespan of many species, such as cockatoos, requires extensive research and monitoring to ensure that populations are still healthy and being supplemented by young, rather than old birds masking a lack of recruitment. The average Recovery Plan for vertebrate animals prepared under the Commonwealth Endangered Species Protection Act costs $100,000 to implement, which may be a useful guide to the expenses incurred.

- **Licensing, monitoring, enforcement and reporting**
  The average cost to employ a single government officer is in the order of $60,000 per annum and is much greater in remote areas. A single 4WD vehicle for such

officers may cost a similar amount to purchase and operate. To undertake these functions well is expensive. Some of these costs are incurred without a legal trade, but these expenses should increase if a legal trade is permitted which could be used to mask illegal activities.

The practical application of full cost recovery to well managed wildlife use challenges many of the suggested benefits of such trade. For instance, with the level of trade proposed by the Northern Territory Government of a few hundred cockatoos per year, very high fees would need to be charged per bird to recoup public expenditure on a well run system. It is likely that the commercial legal price for such birds would approach the reputed black market prices of up to $10,000 for some cockatoos. Under these circumstances it is difficult to see how a legal trade would displace the incentives to a black market trade.

Claimed benefits from wildlife use programs

I am sceptical of the many benefits claimed by wildlife use proponents. The Northern Territory crocodile industry is often feted as a success. I disagree and cite the following examples:

- ***There will be good economic returns***
  The 1992 *"Northern Territory Crocodile Industry Strategy"* comments that government *"expenditure in 1991/92 on the crocodile management program is approximately $1 million* [$10 million over 15 years] *with about 40% recovery directly from the industry. Without such a financial commitment from the NT Government there would be no industry."* The NT crocodile industry produced goods worth $1.9 million in 1990/91. Public expenditure on the industry that year amounted to $600,000. Therefore $1 in $3 produced was an effective public subsidy.

  In a draft NT cabinet submission in 1985, the Conservation Commission NT argued that one of the reasons for expanding the industry *is "the existing public investment by the NT Government can be secured and recovered".*

- ***Habitat of target species will be conserved***
  My estimate of the area of coastal wetlands, which are crocodile habitat, in the Northern Territory, excluding those reserved in their entirety, is 1.1 million hectares (derived from *"A Directory of Important Wetlands in Australia"*, 1993). Despite claims that increased wildlife use will result in conservation of habitat, I am aware of only 2,300 ha at Melacca Swamp being protected ostensibly for

crocodile harvesting since the industry was re-established in 1978. Further, I argue that the major threats to crocodile habitat, sea level rise and weed infestation, are beyond the capacity of the industry to mitigate.

Crocodile industry proponents argue that the detrimental impact of crocodiles eating livestock encourages pastoralists to illegally shoot the animals, and that this should be legalised. This argument fails to consider the very small number of affected pastoral leases (about two dozen on the NT coast), the lack of viability of much of the industry, and best practice for running pastoral leases which would separate stock from major areas of the riparian habitat of crocodiles.

- ***The industry will generate ecological research of benefit for conservation***
  In fact, in the draft 1990-1992 CITES Australian crocodile ranching reports, only two research programs were cited. A one year study of egg incubation and hatchling feeding regimes was directed at assisting the farming industry. The other research was an ongoing population monitoring program. However three of the four population monitoring sites had been overtaken by vegetation growth. We question whether population monitoring at one site is sufficient.

  Further, key research has not been addressed. One example is the role of large crocodiles in maintaining a smaller, stable population of crocodiles. Large animals may be targeted by proposed wild crocodile hunting industries for larger skins and trophies. However, one of the arguments advanced by the Northern Territory Government and industry proponents for wild killing is the need to reduce the apparent growth in the crocodile population.

- ***A humane legal trade will eliminate the black market***
  Police have privately indicated that there were at least two illegal crocodile skin operations in the Northern Territory in the early 1990s. The legal trade appears not to have eliminated the illegal trade.

It should be noted that the current recovery of crocodile populations in the Northern Territory has nothing to do with the establishment of the crocodile industry in 1978. It was the total ban on hunting from 1971 which saved the saltwater crocodile in Australia.

In summary, this example of the NT crocodile trade demonstrates that one of the most celebrated examples of the wildlife use industries has not demonstrated conservation benefits and good economic returns.

(Following this seminar, WWF exchanged correspondence with the Northern Territory Conservation Commission regarding the industry. It is reproduced as ***Appendix 2*** *to this volume for readers to judge the merits of this debate).*

Proponents rarely consider

Proponents of expanded wildlife trade rarely consider a number of key issues. In summary:

- **Opportunity cost and public subsidies**
  Why invest public funds in expanding wildlife industries when there are often more productive investments? For instance, I believe that funds invested by the Northern Territory Government into developing the crocodile industry would have created more jobs, produced a greater economic return and may have been better for the environment if it had been invested in establishing new parks and providing visitor facilities for tourists. Another example is the harvesting of kangaroos in western NSW. The large 'pest' kangaroo population is in large part an artefact of increased availability of water for livestock. Little serious research has been undertaken into the costs and benefits of reducing access to artificial waters (which has a range of environmental benefits) to lower kangaroo populations, as opposed to shooting programs.

- **Accountability**
  Accountability costs a lot of money. Research, licensing, monitoring, enforcement and reporting are not cheap. I remain unconvinced that Australian Governments and wildlife use proponents are willing to undertake these tasks to an appropriate standard and recoup all costs from the commercial beneficiaries.

- **Fluctuating populations and markets**
  Markets have fads. Environments produce periodic surpluses. Wildlife use industries are likely to be subject to the same slumps as other agricultural produce. The proposed export of live birds are one such example. Is this a basis for sustainable industries?

- **Responsibility for pest potential of species exported**
  I argue that we have a responsibility to prevent the export of Australian species which may be potential economic and environmental pests overseas. For example, many of the 'pest birds' of agricultural crops in Australia are likely to be equally bad or worse if they escape into the wild in other parts of the world. Australia's Exotic Bird Registration Scheme aims to prevent exotic pest birds

escaping into Australia's environment. We should not foist our 'pests' onto countries without similar rigorous controls.

Conclusion

Sustainability is hard to demonstrate yet it is reasonable to expect wildlife use proponents to demonstrate that their existing and proposed activities result in net conservation benefits. Such benefits have not yet been clearly demonstrated in the existing industries based on exploitation of native fish and timber.

Australians and our governments in particular need to ask why we should promote an expansion of wildlife use industries when there appear to be so many better economic and environmental alternatives?

KANGAROOS: SUSTAINABLE USE or PEST CONTROL?

by Professor Gordon Grigg,
Department of Zoology, The University of Queensland

Gordon Grigg is Head of the Department of Zoology at the University of Queensland. He has written over 100 research publications and many popular articles in his areas of particular interest - the biology of crocodiles, animal physiology and the population ecology of kangaroos.

I appreciate the opportunity to speak at this conference, and thank the organisers. The first version of the programme referred to a talk on kangaroo farming. However, let us be clear that what I am talking about is kangaroo harvesting, not farming - the harvesting of a free range resource, by shooting, a practice which David Butcher, when he was Director of the New South Wales RSPCA referred to favourably as "the paddock slaughter of an animal unaware of danger". The word farming carries implications of captivity, husbandry and regulated breeding, all inappropriate to the way in which the three large species of kangaroo, the Red *(Macropus rufus)*, Western Grey *(M. fuliginosus)* and Eastern Grey *(M. giganteus)* are handled.

My involvement with the issue of kangaroo harvesting springs directly from personal observations, made on many aerial surveys of kangaroos since 1975, of the extent of land degradation in Australia's arid and semi-arid lands. The results of regular and extensive aerial surveys showed, and continue to show, how numerous and widespread Reds, Western Greys and Eastern Greys are. The *status quo*, in which kangaroos are seen as a pest, with kangaroo management always being equated with kangaroo control, is a cause of considerable dissatisfaction for me. My motives for being involved in this debate, as I have been now for more than ten years, spring from two related concerns: kangaroo conservation and land conservation.

It is relevant for me to identify my general views about wildlife utilisation. An appropriate ecological ethic, I think, is that we humans should endeavour to live on this planet with minimal impact; ideally we should leave as much of the natural system intact as possible, and restore it wherever possible. If the economic value of wildlife can lead to the maintenance of natural habitat, then that is a desirable outcome, and there are many circumstances in which the careful,

controlled use of that wildlife can achieve just that. We should be looking for such opportunities, as a use of land far preferable to its almost automatic clearing before use, and the resultant alienation of native species. If the use thereby of wildlife is consumptive rather than non-consumptive, then the issues are whether or not the killing is carried out humanely, and whether or not the numbers killed are within the capacity of the species/population to accommodate it. But while I support the principle of sustainable use of wildlife as a means of habitat conservation, it is not blanket approval. Rather, I believe that every case should be examined on its merits. That is something which may have been lost sight of in today's discussion so far; people have been debating whether or not they are for or against commercial use of wildlife as if it were a single decision. It is not so simple and, sometimes, a particular case may challenge one's personal sensitivities. For example, I have been opposed to duck hunting, mainly because of concerns about species identification and about whether or not the deaths are swift. On the other hand there is a good argument in its favour because the income from duck licences, coupled with political pressure from hunters, has led to the conservation of many areas of wetland. Many people consider this to be a fine example of the sustainable consumptive use of wildlife which has led to a positive conservation gain. Individuals in the population die, but the populations are conserved, as well as the wetlands and myriads of species along with them which would, otherwise, attract no particular concern or interest. Another example which may challenge one's sensitivities is trophy shooting. This is not to my own liking, yet many people will pay very large amounts of money to shoot a lion, a buffalo, an elephant or even a warthog; and in Zimbabwe, as we heard this morning, thousands of square miles of land that were previously given over to cattle grazing are now supporting wildlife, with people, living on their native lands, gaining more income from trophy shooting than they did from cattle. Also, of course, a whole ecosystem of non-target species is being rebuilt as a consequence, which is what the commercial, sustainable use of wildlife for conservation is all about. Can that be condemned by any person whose concern is the preservation and conservation of as much of the natural world as possible?

Kangaroo harvesting provides a particularly good example of potential conservation gain from their commercial use, and I can see a high value kangaroo industry in Australia having very significant conservation benefits. It may be worth pointing out that a study funded by the Australian Conservation Foundation came to very similar conclusions (Cameron 1991). My campaign for this is an independent one, without financial or institutional backing, although the Royal Zoological Society of New South Wales, a member of the Nature Conservation Council by the way, has given me a lot of encouragement and

provided a venue for promoting public discussion and for publication (see Grigg 1987, 1988; Lunney 1988). The reason that I am keen to promote public discussion of this issue is simple. I am pursuing the development of an idea which could, if implemented, lead to significant conservation benefits and better economic security throughout that area of Australia known as the sheep rangelands (Grigg 1995). The highest densities of Red Kangaroos, Western Greys and Eastern Greys are all within the sheep rangelands. This point has been made before (Grigg 1987), but it is worth making again. The sheep rangelands are now being slowly but surely turned into desert, especially now that goat populations are expanding, and it is now generally agreed and accepted that the total grazing pressure throughout this whole region has to be reduced if the trend towards desertification is to be reversed.

The traditional way of reducing total grazing pressure has been for graziers to promote the reduction of kangaroos. My own view is different because the high conservation value of kangaroos, it seems to me, makes it unacceptable to solve the grazing pressure problems by removing kangaroos. I do not believe that an informed Australian community would allow that. I prefer instead to look for a way to reduce total grazing pressure which leaves the kangaroos there. Many of you here will know that I see a future in which graziers derive sufficient income from kangaroos to encourage them to reduce sheep numbers. My argument is that a marketing drive for kangaroo meat will create a demand for it, against a comparatively limited supply, leading to a high price. This would encourage graziers to see kangaroos as a source of income, instead of a pest, creating an opportunity for better economic viability at lower grazing pressures on their land.

And so we have an interesting dichotomy. On the one hand is a subset of people who want to reduce total grazing pressure by reducing kangaroos; and on the other, a subset (much smaller it seems!) who wish to reduce sheep.

Let us examine this dichotomy a little more. If reduction in kangaroos becomes the preferred mechanism to reduce total grazing pressure, it perpetuates the notion of kangaroos as pests and so what we end up with is the replacement of kangaroos by sheep. Alternatively, we can look at recognising kangaroos as a resource and promote them and market them accordingly. This would lead to graziers becoming stakeholders in the maintenance of healthy populations of kangaroos.

The mechanism to make graziers stakeholders is turning out to be comparatively straightforward. Quotas for an annual harvest of kangaroos are now set in each State and, after approval by the Federal Minister, tags are issued to be put on

carcasses. In South Australia, tags are allocated directly to properties in proportion to kangaroo densities. With increasing demand for kangaroo meat, now that it is becoming more sought after for human consumption, there is increasing business interest, including some new players in the industry. This has led to meat processors beginning to compete for the right to shoot on individual properties in order to secure their share of the resource, to the extent that they pay each landholder a couple of dollars a tag for shooting rights on that property. If the kangaroo industry is successful in achieving better prices for the product, it is easy to see this price rising to the point that graziers see kangaroos in a positive light. After all, there are lots of times when sheep are not worth very much. Out of this may come management of total grazing pressure by reducing sheep, a process that I have referred to elsewhere as "sheep replacement therapy for rangelands".

A very important point I want to make now is that I am not talking about killing more kangaroos than are now approved to be killed under the quota system. What I am talking about is making good use of the kangaroos that are now killed, up to the quota. Most kangaroos are now killed for their skins only; 75% of kangaroos shot in Queensland are used for the skin only. According to figures presented by Switala (1995), the quota this year for Australia, if it were met, would generate about 50 thousand tonnes of meat, of which about 30 thousand tonnes will not be used. If all of the useful meat were to be sold at $4-$6 per kilogram, which is considered probable in the future, kangaroos in the sheep rangelands would be generating meat sales worth about $300 million, on top of the value of the skins. That is more than the return from the sheep - 15% of Australia's sheep numbers - which live in the sheep rangelands. In other words, the costings suggest that, by making better use of the kangaroos already being shot in a sustainable harvest, we could achieve better economic value from kangaroos than from sheep in a very large part of the Australian continental area, and get a conservation benefit into the bargain. There may even be fewer kangaroos shot under this framework because, when quotas are filled or in areas outside the commercial zone, the National Parks and Wildlife organisations now give out destruction permits which allow graziers to kill kangaroos for pest control. These animals cannot be used commercially and large but unknown numbers of kangaroos are killed every year under the destruction permit system. If kangaroos become recognised as a significant resource, it is likely that we will see a gradual ending to the pest destruction of kangaroos.

But let us go back to the dichotomy. What should be the goal of kangaroo management in Australia? At present, kangaroo management is equated automatically in most people's minds with kangaroo control: reducing numbers so

that sheep production is not compromised. But is kangaroo reduction to that extent a practical and acceptable option? I think not and, furthermore, it is by no means certain that the removal of kangaroos will lead to a reversal in land degradation. The human consumption of kangaroo meat has been embraced by many landholders with enthusiasm, but mostly because they see thereby a greater likelihood that there will be an increased incentive for taking the whole quota of kangaroos, up to the maximum permitted, thus maximising the pest control benefit. However, there is no way that harvesting the full quota, which is 15% or 20% of kangaroo numbers, will provide sufficient additional "pest control", beyond what has been its effect over the last 100 years or so. Accordingly, when the quotas are fully taken, this year or next or whenever, there is sure to be great political lobbying for increased quotas. Studies of population dynamics of kangaroos suggest that the maximum sustainable yield is probably 10-15% per annum (Caughley 1987). (That we now have quotas of 15-20% of estimated populations which, empirically, are clearly sustainable, is probably a reflection of conservative population estimates.) It would not be a simple matter to "manage" kangaroo populations at a lower level with a higher quota and, at any rate, I do not believe that the Australian or the international community would accept the setting of quotas at levels likely to be unsustainable in the long run. Indeed, to do so would be against the Approved Management Plans in all harvesting States.

However, there is undoubtedly a growing frustration among landholders about the ineffectiveness of the commercial harvest as pest control. This has led to landholders, their support groups and some government agencies looking for other ways to control kangaroo numbers. Hence, there is now significant government, wool industry and Landcare money going to research for what I call "magic bullets", i.e. better ways of getting rid of kangaroos, quickly and cheaply. Thus we have a research programme supported by the wool industry looking into the development of "self harvesting systems" which will make it easier for landholders to "control" kangaroos. There has also been a lot of research into electrified Finlayson troughs, designed to prevent kangaroos drinking, and many people advocate turning off the water in National Parks so that kangaroo populations will fall. Perhaps most significantly, we have the newly formed Cooperative Research Centre for the Conservation and Management of Marsupials, directed by Professor Des Cooper of Macquarie University, from whom you will shortly be hearing when he responds to my presentation. This Centre has, among a number of programmes, a project on the reproductive biology of marsupials which includes looking for viruses which are species-specific for macropods and possums (a New Zealand connection) for use in potential immuno-contraceptive vectors and, to quote from one of their research proposals,

they are looking to *"develop effective and efficient humane population control methods for problem populations of marsupials based on fertility regulation"*. Naturally I can see that being very useful for control of kangaroos at Yarralumla and on Canberra's golf courses, but I do worry about what is apparently an interest in, and an expression of the desirability of, its use becoming much more widespread. The Queensland Department of Primary Industries funded Queensland Agricultural Biotechnology Centre is member organisation of the CRC which has the particular focus on kangaroo contraceptive technology and, to quote from one of its internal documents, is *"seeking the ability to regulate population growth in line with the fluctuating carrying capacity of the rangelands"*. This implies to me that they are looking for a way to control kangaroos to the extent that kangaroos will be "permitted" only when carrying capacity is sufficient; when there is "room" for them, presumably after the sheep! Apparently the aim is to deliver the contraceptive in water, out of reach of sheep, or via palatable transgenic plants and, because it is reversible, delivery would cease when the carrying capacity of the rangelands is sufficient to make it unnecessary. But will that be ever? And who will decide?

Clearly there is a need for public discussion about the implementation of any such "magic bullet", should it be found. Professor Cooper tells me it is not likely that his contraceptive system will be so successful that it really will be able to reduce kangaroos dramatically over a wide area, but is that the point? Why should it be automatically assumed that it is desirable to do so? The CRC applicants must have assumed so, because that was clearly identified as a potential benefit in their research proposal, and the funding agency must have agreed when it handed over the money.

Much of the present opposition to the kangaroo industry has nothing to do with concern about kangaroo conservation, but is an expression of opposition to the shooting of kangaroos, so the search for non-shooting methods of kangaroo control is supported by animal rights groups. Thus, the search for "publicly acceptable methods of control" of kangaroos brings together the anti-killing groups and the graziers in an unusual alliance. But the animal rights agenda is often very different from the conservation agenda, a point which seems to escape many people. What we are talking about today, as far as I am concerned, is kangaroo conservation, the conference having been organised by the Nature Conservation Council of NSW (NCC). I hope that when NCC develops its policies on the sustainable use of wildlife it will have a clear view of the different ethical bases of conservation and animal rights, the one focusing on populations and ecosystems and the other on individuals. Non-government conservation bodies in Australia

will have a stronger voice and a clearer, less ambiguous message if they distinguish themselves from the animal rightists.

As I said earlier, every case of proposed commercialisation of a wildlife species should be looked at on its merits. It is hard to think of an example with more potential for conservation benefits arising from sustainable use than the example provided by kangaroo harvesting. It is also one which is already, in broad terms, built in to the Australian policy on Ecologically Sustainable Development (see Lunney 1995).

In order to help focus this debate I have drawn up a proposal (**Table 1,** *page 84*) which I now wish to submit formally, and in a constructive way, for consideration by the Nature Conservation Council as a framework which could lead to the development of a policy for the sustainable use of kangaroos. I believe that conservation-minded Australians should encourage sensible steps to be taken towards conserving our kangaroos and the land and vegetation systems which support them, and not sanction the introduction of widespread kangaroo control measures for the benefit of sheep. The NCC has a big responsibility because its policies will help shape public attitudes on the issue. I believe that the idea which I have spelled out here and elsewhere for rangeland conservation is the best one around. Cameron (1991) appears to have made a serious attempt to find otherwise, but could not come up with anything better, and I think that proposals such as that by John Auty and others to remove landholders from their properties are not worth serious consideration. If someone does have a better idea, then let us hear it. In the meantime, I commend the proposed policy to NCC for thoughtful consideration and, I hope, adoption. I will be happy to discuss the proposal further and in more detail if the Council wishes.

References

Cameron J. 1991 Land degradation and the wild harvesting of kangaroos. In "Recovering Ground". Australian Conservation Foundation. Melbourne.

Caughley G.J. 1987 Ecological relationships. pp.159-187 In "Kangaroos, their ecology and management in the sheep rangelands of Australia". Eds. G.J. Caughley, N. Shepherd and J. Short. Cambridge University Press.

Grigg G.C. 1987 Kangaroos- a better economic base for our marginal grazing lands? Australian Zoologist 24(1):73-80.

Grigg G.C. 1988 Kangaroo harvesting and the conservation of the sheep rangelands. In "Kangaroo harvesting and the conservation of arid and semi-arid lands". Eds. D. Lunney and Grigg G.C. Special Edition of the Australian Zoologist 24:124-128. (Surrey Beatty and Sons, Sydney).

Grigg G.C. 1995 Kangaroo harvesting for conservation of rangelands, kangaroos and graziers. In "Conservation through the sustainable use of wildlife" Eds.

G.C. Grigg, P.T. Hale and D. Lunney. Centre for Conservation Biology, The University of Queensland.

Lunney D. 1988 The Grigg proposal for kangaroo harvesting as an economic carrot for the restoration of the arid and semi-arid lands of Australia: Presidential viewpoint. In "Kangaroo harvesting and the conservation of arid lands; a symposium". Eds. D. Lunney and Grigg, G.C. Special Edition of the Australian Zoologist 24:122-123.

Lunney D. 1995 Kangaroo harvesting in the context of ecologically sustainable development (ESD) and biodiversity conservation. In "Conservation through sustainable use of wildlife" Eds. G.C. Grigg, P.T. Hale and D. Lunney. Centre for Conservation Biology, The University of Queensland.

Switala J.P. 1995 The potential supply and value of kangaroo meat. In "Conservation through the sustainable use of wildlife" Eds. G.C. Grigg, P.T. Hale and D. Lunney Centre for conservation Biology, The University of Queensland.

TABLE 1

SUGGESTED NCC POLICY ON KANGAROO HARVESTING
(Proposed by Professor Gordon Grigg)

THAT the Nature Conservation Council of NSW RECOGNISE:

1. the desirability of maintaining viable populations of all commercially harvested kangaroo species throughout their current ranges;

2. that, in the interests of sustainable land use and the conservation of biological diversity, there is a need to reduce total grazing pressure in Australia's rangelands;

3. that a reduction in total grazing pressure by reduction of kangaroos is limited by kangaroo conservation constraints, while reduction of total grazing pressure by livestock reduction is constrained at present by economic factors; and

4. that kangaroo harvesting at present rates is not having a significant effect in reducing total grazing pressure in the sheep rangelands, and that harvests at non-sustainable rates are unacceptable to the conservation community;

and therefore RECOMMEND:

1. that reductions in total grazing pressure be sought through finding economically viable ways to reduce domestic livestock, rather than by reductions in the numbers and distributions of kangaroos;

and further RECOMMEND:

2. against the implementation of any widespread use of emerging technologies to bring about significant reductions in kangaroos, outside the sustainable harvest quota, such as self-harvesting systems, Finlayson troughs, and the widespread distribution of contraceptive baits.

THAT the Nature Conservation Council of NSW also RECOGNISE:

1. that a reduction in total grazing pressure will be achieved more easily in a climate in which kangaroos are seen by landholders as a valuable resource rather than as a pest; and

2. the potential role of an increased-value kangaroo industry to help achieve that reduction, through providing landholders with a mechanism to maintain economic viability at reduced sheep numbers;

and therefore SUPPORT IN PRINCIPLE the current moves to bring about a conservation benefit from a government regulated, high value, sustainable kangaroo industry.

A COMMENTARY ON THE POSSIBILITY OF SUSTAINABLE KANGAROO HARVESTING

by Prof. Des W. Cooper,
Research Director, CRC for Conservation and Management of Marsupials, Macquarie University

Des Cooper is a Professor of Biology at the School of Biological Sciences, Macquarie University, and also Research Director of the Cooperative Research Centre (CRC) for Conservation and Management of Marsupials.

Any commentary on conservation policy implies some kind of philosophical position by the commentator. I therefore begin this discussion about the desirability and practicality of harvesting kangaroo populations, by making my own position quite clear.

Firstly, conservation of our flora, fauna and landscape requires active human intervention. Conservationists often give the impression that all that is needed is to get humans to stop doing something - cutting down forests, mining or whatever. In my view, this approach is at best only half the answer. Our indirect effects upon the environment are at least as great as our direct effects. The feral animals we have introduced into Australia continue to cause change and degradation which must be stopped if we wish to preserve our total environment.

Secondly, land degradation throughout the arid and semi-arid areas is the largest environmental issue facing Australia. Erosion of fragile soils is caused by the interaction of drought, pastoral and agricultural practices and feral animals. This process is proceeding steadily and inexorably, at a rate which makes it quite obvious. While many of us acknowledge that the creation of deserts is the likely endpoint, little is being done to prevent that happening.

Thirdly, in any conservation policy, native animals should take priority over introduced animals, with the exception of the species *Homo sapiens*. I am especially concerned with marsupials, and I regard Australia as having a primary responsibility to study and preserve these species.

Fourthly, I do not believe that it is wrong for humans to kill infra-human species. Indeed, in terms of animal welfare, it is better to control the size of populations of kangaroos (for example) by shooting rather than to allow them to die slowly from

thirst and hunger during drought. Nor do I have any objection in principle to the use of animals so killed to provide leather or meat. Of course, if there were more humane methods of controlling population size they would be preferable.

My remarks are made in the context of the proposal by Professor Grigg for sustainable harvesting of kangaroos in the semi-arid lands of Australia. An examination of his paper elsewhere in these proceedings makes it obvious that there is no philosophical difference between us on the issues.

I do not however agree that kangaroo harvesting is a desirable long-term endeavour. My main reservation can be stated very simply. For those areas where a mix of sheep raising and kangaroo harvesting is being advocated as a way of controlling total grazing pressure, periodic drought occurs. During drought, irreversible land degradation follows, principally through erosion. This cannot go on indefinitely. The question which needs to be asked is which areas of Australia can be exploited indefinitely for pastoral activity. I suspect that when this question is answered, most of the areas where sheep and kangaroos currently co-exist will be shown not to be part of them. If sheep are removed from these areas, it would probably not be possible to make a living by kangaroo harvesting alone.

The history of wheat farming in South Australia is instructive (Meinig, 1970). Early success in growing wheat after the settlement of the colony came as the result of some exceptionally good years between 1869-1880. Drought followed, and it became clear that sustainable wheat production was really only possible behind "Goyder's Line" drawn on the basis of average rainfall. Part of Goyder's Line follows the sharp demarcation between the relatively well-watered lower Flinders-Mount Lofty Ranges and surrounding semi-arid areas. No such obvious physical border between well watered and semi-arid areas exists in Eastern Australia. Thus the areas of long term sustainability are obvious in South Australia but not so elsewhere.

A series of "Goyder's Lines" for pastoral activity is needed in most of Australia. Advocates of market forces may say that the market will ultimately define these. The wretched time which many pastoralists have had in recent years is part proof of this. In the meantime, long-term damage is being done to soils. Attempts by government to legislate along these lines are unlikely in the current ideological climate. This is not new. Governmental restriction of settlement expansion in South Australia in the 1870s was deeply unpopular. The government policy, which was partly motivated by what we would now call environmental consideration, turned out to be correct.

Other reservations concern the stability and profitability of the market for kangaroo meat products. It will always be a speciality market, appealing to the relatively small fraction of people prepared to eat game. Unless there are rather large changes in eating habits - possible, perhaps, in Asia - the consumption of kangaroo meat is likely to be subject to fashion. Changes of attitude in Western society need to be taken into account. Tastes are moving away from red meat. The animal rights movements have become a political fact of life, and their influence is unlikely to decline. Even now many pastoral areas are economically marginal. If I had money to invest in agricultural or pastoral activity, I would in areas with long-term reasonable rainfall, which means near the coast in Eastern Australia.

The Cooperative Research Centre for Conservation and Management of Marsupials has as one of its missions to find humane ways of controlling marsupial population numbers. The introduced brushtail possum in New Zealand is a major target. So also are the larger species of kangaroo, which are frequently in local over-population e.g. Yarralumla in Canberra, on golf courses and in towns generally, as well as in pastoral areas.

Our main approach is through immunocontraception, in which the animal's own immunological system is turned against a component of its reproductive system - eggs, sperm or the interaction of the two which leads to fertilisation. The use of immunocontraception for controlling wildlife numbers has been advocated in the Australian context by Tyndale-Biscoe (1994). Immuno-contraception is undergoing clinical trials for humans. It offers the promise of being relatively inexpensive and of having few, if any, side effects. If one can inject an animal using a syringe and needle, it can undoubtedly be made to work.

However, it is another matter to apply it to a whole population. Our present thinking is that we will try to incorporate the vaccine into a domestic plant (e.g. a carrot or a potato) which will not grow in the wild. That is, we will make a transgenic plant which makes the required marsupial pituitary hormone, egg coat protein, or sperm surface component. Immunisation would then be oral. This may be difficult to achieve, and is certainly the major technical challenge facing us. Oral vaccines exist for very few antigens. If it can be made to work, it will fulfil most of the requirements for population control - economic production of the vaccine, reversibility, no suffering by the animals and control of its distribution by managers. The possibility that the approach might be extended to feral animals is of course also under consideration, notably by the Vertebrate Biocontrol Cooperative Research Centre.

References

Meinig, D.W. On the Margins of the Good: the South Australian Wheat Frontier, 1869-1880. Rigby Ltd. Adelaide, 1970.

Tyndale-Biscoe, C.H. (1994). Virus-vectored immunocontraception of feral animals. *Reprod. Fertil. Dev.* 6, 281-287

THE INDIGENOUS PET INDUSTRY: NATIVE MAMMALS AS PETS

by Dr. Paul Hopwood,
Senior Lecturer in Veterinary Anatomy,
University of Sydney

After graduating as a veterinarian in 1969 Paul Hopwood practised in both NSW and the United Kingdom until 1973, when he joined the staff of the Department of Veterinary Anatomy at the University of Sydney. His PhD thesis was on the quantitative anatomy of kangaroos. He has also published a monograph on the lymphatic system of kangaroos. A love of rural Australia has led to a lifelong professional interest in native fauna, and in particular the commercial, recreational and aesthetic ways in which we interact with them.

Look in the telephone book for a listing of the Department of the Thought Police and it cannot be found. However, we all know that they exist. How otherwise could today's seminar topic be edited to become so politically correct.

The Thought Police direct us to the view that the "Sustainable Use of Wildlife" is to be interpreted as a "Utopian Dream" or alternatively as an "Unrealistic Nightmare".

Again Session B is the ideologically driven "Consumptive Usage of Indigenous Wildlife" with an undertone that is almost tuberculous.

The Thought Police have decreed that sustainable use of wildlife is not responsible fauna management.

Many people would consider us a liberal society. But step outside the boundaries of the Thought Police and you may become the consumptive, exploitive perpetrator of an unrealistic nightmare.

One is tempted to reply --- Humbug!

Pet keeping is a mutualism where we can offer an Australian native mammal, a fellow sentient being, life, shelter, food, security and veterinary medical attention in return for companionship!

Ethically, there are 3 independent and substantive grounds to support pet keeping.

1. Community tradition is one of pet keeping. The mix of traditional pet species varies in Australia. Historically Australian native animals including mammals have been kept as pets in all States. Currently, it is legal to keep Australian native animals in all States, and with respect to mammals, scheduled species are legal in about half of the States. Pet keeping as a form of mutualism is a well established Australian ethic. The welfare of such animals is safeguarded by various State legislation and pursued by organisations such as the RSPCA.

2. Theistic moral codes from Jewish/Christian/Muslim traditions allow animals to be kept as pets. These codes prescribe the general animal welfare guideline that:

A righteous man cares for the needs of his animal

[Proverbs 12:10].

3. Utilitarians keep native animals as pets simply on the pragmatic ground that benefit is derived from the pet. The benefit may be tangible, recreational or emotional. Fortuitously, two intrinsic utilitarian concepts safeguard the welfare of the animals. These concepts are summarised by the maxims that:

better milk comes from contented cows; and

that one must not kill the goose that lays the golden egg.

Philosophically, there are precious few grounds for establishing moral or ethical imperatives. One must ask those who oppose pet keeping how they establish their position as the high moral ground. Community practice, theistic given concepts, and utilitarianism offer little support.

One must also ask those who approve of pet dogs and cats but not suitable Australian native species, on what ethical basis do they differentiate between the species. There is no absolute moral or ethical principle that establishes greater rights for wild than for domestic animals. Who would want to arbitrate an artificial code of ethics where one status is given to wild animals, another to wild animals that have been tamed, another to domestic animals that have gone feral, and yet another to traditional domestic animals? Pet keeping in relation to Australian native mammals raises question of species suitability and appropriate management practices but not different ethical principles.

The contemporary Australian ethic is to keep animals for food, clothing, sport, companionship and the enrichment of our environment. It seems bizarre to me that such a pragmatic, self evident ethic needs restatement or that the more benign aspect of the ethic, that is pet keeping, should need to be defended.

Mutualism is a symbiotic relationship from which both species derive benefit. The basic tenet of my paper is that mutualism is good and that the pet industry is a mutualism. Consequentially the commercial breeding of selected suitable Australian native mammals as urban pets is ethical and justified on utilitarian grounds. The utilitarian grounds hold from the viewpoints of both the pet owner and pet species.

In the context of an address to a Nature Conservation Council of NSW seminar I will concentrate on the conservation implications of an "Indigenous Pet Industry". In particular, I will focus on Australian native mammals. However, this should in no way be interpreted to minimalise the tremendous benefit in terms of emotional satisfaction that people and in particular urbanised people obtain from keeping native animals.

It is common knowledge that we have a serious problem with native mammals in NSW. To quote Dickman (1994):

"A total of 131 non-marine species of native mammals, including the dingo *Canis familiaris dingo*, has been recorded in New South Wales since the early days of European settlement in 1788. Twenty-nine of these species are now extinct in the State; 21 species remain extant beyond the borders of New South Wales while eight species are extinct. Most losses (21 species) occurred before 1900, particularly in the arid western region of the State. Overall, State level extinctions represent 39.3 per cent of native rodents (11 of 28 species), 27.0 per cent of marsupials (17 of 63 species) and 2.7 per cent of bats (one of 37 species). Forty-eight extant species of native mammals are considered to be presently endangered, including 20 species of marsupials, nine rodents and 19 bats."

What to do about the problem is another matter.

To re-establish a species in numbers and/or distribution, the primary factors that led to the initial decline need to be dealt with. If predation by foxes and cats, or if competition for feed by rabbits and sheep have been significant factors in a species regression, then our primary focus must be on providing relief against such influences.

However this understanding does not denigrate other supportive endeavours.

For example, are there new habitats endangered species may colonise?

For example, are there additional ways to attract extra political and financial inputs to the problem?

To begin by answering questions with a question.

If the early settlers had adopted the thylacine as a pet marsupial dog, would the species be extinct today? In one sense the question cannot be answered as it cannot be tested. However, on the assumption that the thylacine was one of those wild species that we know to tame easily and breed in captivity the answer would be:

No it would not be extinct today.

So is it better to have an endangered species in captivity, or leaving it to its fate in the wild, have no species at all?

Surely, it is nothing short of irresponsible not to take every step possible to set up buffer populations of endangered species as an insurance against natural habitat disasters. The question really becomes not if, but how should we set up these buffer populations.

We have missed our chance with the thylacine but what about other native mammal species under serious threat?

Bilbies *(Macrotis lagotis)* are long-eared bandicoot like animals of 1-2 kg body weight. They are delicately built, with a long pointed muzzle, rabbit like ears and soft and silky hair. Two species are known of which *Macrotis leucura* is probably extinct and *Macrotis lagotis* is endangered, being restricted to central and western Australia. The bilby was common and extended across the arid and semi-arid regions of Australia until predation by foxes and grazing competition from rabbits and livestock reduced it to an endangered species (Johnson 1983).

A rescue plan was devised. A bilby breeding programme was set up within an Australian zoo. The intention was to learn more about this attractive marsupial and to use captive bred animals to reintroduce the bilby into areas of Australia it had previously occupied. Bilby breeding was a spectacular success with the bilbies breeding prolifically. The reintroduction project failed, becoming known locally as

"warm meals on wheels". The problem was that as fast as the bilbies were released foxes ate them. The zoo having no capacity for large numbers of bilbies was forced to curtail breeding. Is the solution in this case to do nothing while we wait for control of the fox population? Can we afford to wait forever?

Why not continue to breed bilbies for commercial sale? Why not make them available to enthusiasts in urban areas? Bilbies can be kept quite nicely in dog-run like pens on the typical urban quarter acre block. People develop all types of hobbies and in a city like Sydney you may be able to establish a bilby society the equal of, or larger than any of the current cat and dog breed societies. The advantages are numerous; many people would derive pleasure and satisfaction from keeping the animals, much more would be learnt about bilbies, commercial returns to the breeding zoo would be useful, there would be more bilbies around. An endangered animal would be established in perpetuity with the status of "pet" in a new urban habitat.

Now on the question of costs in establishing buffer populations of endangered animals.

There is no point in simply saying the government ought to do it. Government is strapped for cash and under a multiplicity of demands from all sectors of society. We need to ask where the large amounts of cash necessary to establish buffer populations of endangered animals may come from. The BIS (1994-5) survey of the pet care market in Australia estimated the current total expenditure on pet care to be in the order of $2.2 billion. We need to ask if some of these dollars can be redirected to the establishment and maintenance of populations of endangered mammals.

One interesting observation should be made at this point. In North America the trend in pet keeping is towards pocket pets. Urbanisation and unit dwelling increasingly limits the space available for pets. Not surprisingly, people are becoming more interested in the smaller species. In Australia in excess of 85 per cent (Year Book Australia 1995) of our population is urbanised and the percentage is growing. If this trend is coupled to the fact that we have in excess of 100 species of native Australian mammals with a mature body weight of less than 100 grams, we have a natural range of pocket pet species possibly suited to the home unit environment. Again if we look at those species of native mammals that are endangered and rare, many are small species.

The pet industry is a funding base that remains virtually untapped as a source of conservation dollars for NSW native mammal species. In NSW not one of our native mammal species significantly benefits from the pet industry dollar. Is it sensible to spend annually in Australia $2.2 billion (BIS 1994-5) primarily on dogs and cats?

In those states of Australia that allow native mammals to be kept as pets, the policy emphasis is wrong. Common mammals are allowed while rare and endangered mammals are prohibited. From a conservation viewpoint, and providing that the species is suited to pet keeping, the more endangered the species the HIGHER the priority it should be given for commercial captive breeding. For example, there is little conservation merit in establishing captive populations of already abundant brush tailed possums whereas there is substantial merit in establishing captive populations of endangered bilbies.

A passing comment should be made on another benefit in keeping suitable native mammals as pets. By introducing pet options to people, the number of people who choose to keep cats will be reduced. It can do nothing but good for fauna conservation to reduce the cat population of Australia. Unlike agricultural areas where cats are open season, one cannot go around an urban area physically reducing cat numbers. Displacement of cats with alternative pets is an acceptable method of reducing the cat population.

Now I suspect that in the next talk Julie Hughes will tell us why native mammals cannot be kept as pets. I suspect that a series of examples will be given in an attempt to establish that the management requirements of native mammals are incompatible with urban pet status, that humans cannot be trusted with pets in general or native mammal pets in particular, and that the present commercial retail pet industry is an unacceptable distribution network for native mammals.

One can agree that there are real differences between knowing in principle that keeping native mammals as pets is good policy and the practical day to day regulation of the policy. I would contend that abuses which may arise need to be addressed by regulation and not by counterproductive blanket prohibition. Every year people die from electrocution but there is no serious suggestion that we prohibit the use of electricity. In essence it is a matter of balance.

It would be unwise to argue that all our native mammals are suited as pets. Some by reason of dietary requirement, habitat preference, size and temperament are totally unsuited. However, to argue that all 250 or so species are unsuitable is

wrong. It is legal to keep, and native animals are kept as pets in all States of Australia. All Australian states have animal welfare legislation and native mammals are currently kept without undue animal welfare concern in South Australia, Victoria and the Northern Territory.

There may still remain an uneasy feeling that perhaps allowing the general public to get their hands on any of our native mammals is just not safe. How can the system be made to work? A workable system may be as follows.

Licensed retail pet shops would be the point of purchase of the native mammal. For a pet shop to be licensed to sell scheduled native mammals it would be a requirement of the license that:

1. the shop manager hold an appropriate TAFE qualification in the management of all species to be sold;

2. the shop stock for sale approved literature on the management requirements of all species sold;

3. the shop stock consumables required for all species sold;

4. the shop be able to sell materials for, and to organise installation of approved facilities for all species sold; and

5. the shop provide NPWS license application forms for prospective pet owners to complete. The application form to include a questionnaire on the management of the species to ensure that the purchaser was knowledgable in housing, feeding, and handling of the animal before a license could be issued.

There would be little wisdom in allowing a Noah's ark of native mammals to be kept on the premises of a small retail shop in a suburban shopping mall. Animals could be viewed on videotape or from catalogues. The shop would advise the prospective pet owner of suitable native mammals for their residential situation. On selection of a pet, delivery would be effected direct from a central commercial breeding facility and would be conditional on issue of an appropriate NPWS license. The commercial breeding facilities would be required to conform to animal welfare regulations similar to those applied to facilities for breeding animals for scientific research. Where necessary, captive native mammals would be microchipped to ensure identification of the source of the animals. Animals delivered from the breeding facility would only be signed over if approved holding facilities were installed. Included in the purchase price would be a right of return

of the animals at no further charge. A pet owner no longer in a position to keep an animal would be able to have the animal relocated with a phone call.

Sadly, few Australians have had the pleasure of handling, keeping, breeding and exhibiting our native animals. This privilege has been restricted to research scientists, zoo and wildlife park staff, urban wildlife rescue services and a few discrete and covert enthusiasts who exist on the fringes of the National Parks and Wildlife Act 1974.

Sadly, millions of dollars are spent each year by Australians in maintaining a large pet cat and dog population.

Sadly, endangered native mammal species continue to face a battle for their very existence.

I would urge the Nature Conservation Council of NSW to promote the commercial breeding of selected endangered Australian native mammals.

References

BIS (1994-5) Survey of the Pet Care Market in Australia

Dickman, C.R. (1993) Mammals of New South Wales: past, present and future. Australian Zoologist 29:158-165

Johnson, K.A. (1983) Bilbies in The Australian Museum:Complete Book of Australian Mammals. Ed R. Strahan Angus & Robertson: Sydney

Year Book Australia (1995) Ed. Ian Castles. Australian Bureau of Statistics: Canberra

NATIVE ANIMALS AS PETS

by Julie Hughes,
Coordinator, Fund for Animals

Julie Hughes is the Coordinator of Fund for Animals, a Sydney-based animal welfare organisation. Fund For Animals operates an animal shelter, campaigns on a broad range of animal welfare issues and is particularly concerned about threatened species and the protection of marine life. Julie has a special interest in the rehabilitation of Australian wildlife.

A cute little ring-tailed possum would make a lovely pet. Or would it? While it is now possible to buy one in Victoria for example, it is illegal at present to keep possums as pets in New South Wales. However, there is strong pressure being exerted by various groups to have the situation changed.

Pets are a wonderful part of our lives and the benefits to humans of a close association with their pets is widely acknowledged. Even though we know reasonably well the best means of meeting their health and welfare needs, many people still do not properly care for their pets. How then can we justify introducing more species as pets, especially when we know little about their requirements?

The main reasons given for developing a pet trade based on native animals are that it will assist in preserving wildlife and that they are less destructive to our native fauna than are our present pet species. However, the bottom line seems to relate to the profitability of the trade. The welfare of the animals rates a poor second.

The implications of this form of exploitation of native animals have not been thought through adequately and history shows that we don't learn from our mistakes. In the case of having native animals as pets, we need to prove history wrong.

Unfortunately, most of the discussion on the topic of native animals as pets tends to be one-sided. Proponents of the new trade point to benefits flowing from it and tend to ignore those aspects that are more difficult to quantify such as outlining the needs of native animals and stipulating how these can be met in an "unnatural"

environment. To ensure that we take all aspects into account when making decisions about keeping native animals as pets, a sound framework is essential.

A model which is being developed to evaluate conservation issues, can also help in evaluating the question of keeping native animals (Alan Stewart and Associates). The model looks at the issue from both an instrumental and intrinsic values perspective, and from scientific and cultural perspectives.

At one end of the values spectrum are instrumental values which are quantifiable in monetary terms. Therefore, we need to look at who is going to make money out of the industry - the pet shops, the people who breed the animals, the people who give veterinary attention and the people who build the cages and supply food.

At the other end of the values spectrum lie intrinsic values such as aesthetic values and ethical values. These values are hard to quantify, and frequently are left out of the discussion. How do you put a monetary value on the presence of an animal in the bush?

Attempts have been made by economists to place values on these "unpriced" benefits by, for example, surveying people and asking questions like "what extra amount would you be prepared to pay to have the animals stay in the bush?" Although attempts are being made to express these values in monetary terms, do we need to do this? Rather, we should accept that these are not quantifiable in an economic sense.

People arguing from an intrinsic values perspective believe that native animals in the wild have intrinsic value as they are. These people are concerned about the welfare aspects of the native animals being taken out of their natural environment and being placed in a substitute environment, even if this new environment has been determined on the basis of scientific information.

Coupled with the values perspective is the question of how we perceive the issue. The scientific and cultural perspectives are at two ends of the continuum. The scientific approach emphasizes objective factors and will point to scientific evidence illustrating that it is possible to keep native animals in cages, feed them and breed from them.

People taking into account the cultural perspective question how well our culture currently treats companion animals. Already, we have a massive problem with unwanted companion animals. One group alone, the RSPCA, receives more than

2,000 animals a week Australia wide, and has to kill more than 1,000 of these animals each week. Most of these euthanased animals are companion animals, cats and dogs. In

addition to these animals, there are the animals killed in council pounds and those killed by other major animal welfare organisations throughout Australia. As well, there are animals killed by owners privately. Thus, it is difficult to obtain accurate figures on the numbers of companion animals disposed of each week. Clearly, animals are regarded by many as just another object to be cast off.

To some, the objective nature of the scientific approach will mean that it must be given more weight than the more subjective nature of any assessment of the cultural approach. However, the scientific approach also means that we should acknowledge when there is inadequate information about an issue. Do we know enough about the environmental and dietary needs of native animals? In terms of veterinary treatment of native wildlife, it must be acknowledged that because most of our veterinarians are not trained in wildlife care, it is likely that our new pets will be presented to ill-prepared veterinarians.

Some may argue that this is all comparative; if the biology of one animal has been studied, then comparisons can be made. However, this is not always true. For example, the reproductive system of marsupials is completely different from that of eutherian mammals. As well, different native animals react differently to drugs and have different reactions to stress. It is imperative that these shortcomings in our knowledge base are addressed.

Clearly there are problems in using the scientific approach alone in decision-making.

Principles from the Interim Australian Natural Heritage Charter (designed to assist those with an interest in the significance and conservation of natural heritage to assess, protect and manage natural heritage places, but not specifically wildlife), can be used to further assess the issue of native animals as pets and to evaluate scientific principles.

Thus, the uncertainty principle, which acknowledges that the level of uncertainty about our knowledge is very high, and that the full potential significance of the value of any natural resource remains unknown because of this uncertain state of knowledge, is relevant. This principle needs to be applied to the current topic. It means simply, that "we know that we don't know what we need to know".

Given that we know that we have an inadequate knowledge base, know that native animals have highly specific management requirements and know that we already dispose of large numbers of unwanted animals, do we really want to introduce a new pet species into this cultural environment? The pets we have at the moment, such as dogs and cats are fairly low maintenance and are adapted to living with us. They are generally given free rein to wander within our home environment. In most cases they amuse themselves during the day when humans are away.

However, if we bring wild animals into our environment, they will need to be caged or contained in some other way.

Naturally, any animal in an enclosure requires a lot of management, including cleaning. This can be a major source of family disharmony. In most households, the adult female is the one who has the final responsibility for the care of animals. While some children do meticulously care for their pets, the majority do not. At Fund For Animals, for example, rabbits and guinea pigs are often surrendered because children have lost interest. Similarly a dog may be surrendered because there is no commitment to exercise her and problems develop due to her being locked in the backyard with no attention to meeting her needs.

To provide an interesting and varied environment for our pet animals, whether they be dogs, cats, hopping mice or possums, costs time and money. At present, many people don't spend money desexing or vaccinating an animal, and don't find the time to exercise the dog. Thus, even if information was readily available on the environmental needs of native animals, is it likely that people would spend the time or money enriching their pet's environment?

The alternative of course, is not to cage the animals. This is fraught with danger. If you have a "pocket pet", the home can be a deadly environment. A bookshelf is dangerous. Imagine your Spinifex Hopping Mouse after the complete works of William Shakespeare have fallen on her. Or what about the Sugar Glider that drowned in a vase of flowers, or the Ring Tail Possum drinking from the toilet bowl who fell in and drowned. These accidents have all occurred.

Again with respect to cultural values we must consider another principle taken from the heritage charter, namely, intergenerational equity. This is the moral requirement that the present generation ensures that the health, diversity and

productivity of the environment is maintained or enhanced for the benefit of future generations.

Regarding wildlife, this requirement can be argued both ways. Proponents of the indigenous wildlife industry argue that when people develop love and respect for the pet bilby in their backyard, then they are going to join the "Save the Bilby Society" to protect the bilbies' habitat. However, as time goes by, bilbies will cease to the pet of the month and a new species will be promoted.

As well, some will argue that the need to protect the bilbies' habitat will not be such an issue if bilbies breed well in captivity. If they become extinct in the wild, then we can release captive animals.

Unfortunately it doesn't work this way. We know that captive bred animals have a sorry history of return to the wild. Clearly, they don't learn survival skills when raised in an artificial environment.

Once you put wildlife in the backyard as a pet, it's no longer wildlife, it's an animal that lives in the backyard, or in the house. Most aspects of the animal's lifestyle change, including diet, and social and behavioural patterns. For example, an echidna eats termites and spends much time hunting for termites. While a formula food may sustain an echidna from a nutritional point of view, the echidna in the backyard being fed formula food would be deprived of its natural food-finding behaviour and usual diet. Consequently its ability to survive in the wild would be severely compromised.

Similarly, from an animal welfare perspective, how fair is it to keep a Sugar Glider in a small cage? Sugar Gliders in the wild glide from tree to tree, sometimes with glide paths up to fifty metres.

Once you put native animals into cages and backyards, it is impossible to return them to their natural environment.

The introduction of native species into the pet market cannot be justified on any basis other than an economic basis. If native animals do join the pet market then the welfare of the individual animals involved will almost certainly be compromised, and the future of the species may be jeopardised. Decisions need to be made taking into account the whole range of relevant issues.

HUNTING, SUSTAINABLE UTILISATION and CONSERVATION

by Dr. Max King, Safari Club International (Australian South Pacific Chapter Inc.)

Before retiring in 1993 to graze cattle on his property near Balranald in NSW, Max King worked as a research biologist in the Research School of Biological Sciences at the Australian National University (1976 to 1984), and was also Senior Curator of Terrestrial Vertebrates at the Northern Territory Museum (1985 to 1993). He has published extensively on the evolutionary biology of the Australian fauna, and is currently Senior Honorary Research Fellow at the Department of Genetics, Latrobe University. As a sometime representative of the Safari Club International he has spoken widely and written extensively on the topic of hunting and wildlife conservation.

Hunters

Historically, man has hunted to survive whether this has involved tracking the honey bird to an African beehive; hunting for witchetty grubs in dead paperbark trees; spearing turtles or dugong in Northern Australian seas; catching fish with a man made lure; or stalking deer and slaying them with a spear, an arrow, or a rifle bullet. Man as a species, has hunted to provide food and materials for his survival and he continues to do so today. Modern recreational hunters utilise what they hunt whether this is in the form of food, as clothing, as items for sale, or as trophies. Utilisation is one of the major hunting ethics.

Distinctions should be made between recreational hunters and commercial hunting operations on the one hand, and professional and amateur animal culling operations on the other. Recreational hunters carry out their activities on foot and generally at dawn or dusk and in daylight hours. In contrast, culling operations, which are not hunting but control or eradication procedures, involve shooting from vehicles and generally using spotlights at night. I will be discussing recreational or sport hunters in this paper.

Hunting is a major recreational pastime and is an internationally accepted activity. There are over 14 million hunters in the USA. In Australia, with its much smaller population, there are currently 1 million registered shooters, 85% of whom are hunters. Significantly, the number of people involved in hunting is increasing. In

Great Britain, during the period when anti-hunting propagandists and animal liberationists were waging their most vociferous campaign, the number of participating hunters increased from 591,000 in 1982 to 829,000 in 1992 (Cobham Resource Consultants, 1992).

Hunters and Conservation

Hunters, although large consumers of wildlife, are also the greatest conservationists. They do not just talk about conservation, they do something about it, and usually in cold, hard cash. For example:

1. Hunting organisation such as Safari Club International have donated US$50 million to conservation projects throughout the world.

2. North American waterfowl hunters have over the last 60 years raised US$4.6 billion for the conservation of ducks and their wetland habitats (Environmental Economics Society Journal, July 1995). Indeed, the activities of Ducks Unlimited, a North American hunter based organisation, has guaranteed the survival of waterfowl on that continent by the judicious purchase of both breeding wetlands and migratory refuge areas.

3. The hunting and trophy fees paid by hunters have maintained habitat for species throughout the world by benefiting the people who own the land and own the animals on it. The Zimbabwean CAMPFIRE scheme (Communal Areas Management Programme For Indigenous Resources), has doubled the income of rural Zimbabweans by giving the village landowners ownership of the wildlife and thus access to hunter's trophy fees. It has also encouraged these villagers to regard wildlife and its habitat as a resource rather than an obstacle and a hindrance. This strategy has directly resulted in less land clearing for subsistence agriculture.

4. Indigenous village groups in other countries are also greatly advantaged by access to trophy hunting returns. For example, Canadian polar bear populations are co-managed by agreements between the government of the North West Territories and village groups. Quotas are set by the government, and the villagers decide on the quota allocated to the sporting hunters. Some 500 Polar bears are killed in Canada each year from a population of 13,120 (the world population is between 21,000 and 28,000). Only 10% of the cull quota is allocated to recreational hunters. Each hunt has an average cost of US$18,500

and 80% of the money derived from this stays in the villages (Conservation Digest, August 1995).

Indeed, the same type of arrangement occurs in Australia, where safari operators on Coburg Peninsular in the Northern Territory pay aboriginal landowners trophy fees for Banteng and Buffalo taken on their land. Safaris in other parts of the Northern Territory involving Buffalo, Magpie geese, Barramundi and now Saltwater crocodiles, directly benefit Aboriginal Australians.

Hunters have had a major impact on conservation in many other areas. I will give you a few examples of these:

1. Many of the world's great national parks were created by hunters. For example, the American President Theodore Roosevelt, a great hunter and museum collector, constructed a series of national parks throughout the United States of America. Today, paying hunters are used to control populations of game species in these areas. In Australia, the Victorian Liberal premier Henry Bolte, who was a keen waterfowl hunter, established a network of 35 wildlife reserves and hunting reserves to guarantee the survival of waterfowl species throughout that state. Interestingly enough, New South Wales has only one hunting reserve.

2. Hunters have been responsible for the formation of some of the great conservation organisations present today. The World Wildlife Fund was established by keen hunters such as Prince Phillip the Duke of Edinburgh, and Sir Peter Scott, a legendary waterfowl hunter. The African Wildlife Foundation, one of the largest and oldest African conservation organisations, was established by big game hunters. Ducks Unlimited was established for waterfowl conservation by duck hunters.

3. In Australia, groups of hunters are forming partnerships and syndicates, purchasing valuable wetland and wilderness areas for the managed hunting of introduced and native species. Indeed, hunting groups have been deeply involved in waterfowl conservation for the past fifty years. The Australian Field and Game Federation has been responsible for a number of key conservation strategies including placing nesting boxes in breeding areas; waterbird banding programmes; waterbird counts and aerial surveys; lead shot surveys; vermin control; wetland restoration (Mt. Marcella Swamp restoration in southern Queensland: Bool Lagoon, Loveday and Noora wetland rehabilitation projects in South Australia involving 10,000 hectares

of wetlands and the restoration of Dowd's Morass and Hospital swamp in Victoria), and establishing new game reserves at Moulting Lagoon in Tasmania and Singleton in Western Australia.

4. Hunters have played a direct role in the conservation and management of rare habitat types which require precise and dedicated management procedures to survive. A fine example of this is seen in the grouse moors of Northern England and Scotland where mosaic burning is essential for the survival of the habitat and is critical for the management of grouse populations. These provide an enormous and lucrative industry to Great Britain worth many millions of dollars annually.

As I have shown, the role of hunters in conservation is multifaceted. Their interest in conservation can be attributed to their love for the bush and the wildlife. Hunters are deeply involved in the conservation process.

Sustainable Utilisation: a Hunter's Conservation Strategy

As a hunter, I find it surprising that we are sitting around and discussing the value of sustainable utilisation to conservation, as if it were some new theory trotted out for conservationists to gape at. In reality, there is nothing new about sustainably utilising wildlife: it simply means sensible population management and this has been going on for the last thousand years in Europe.

Historically, hunting was a preserve of the aristocracy who were keen to keep it as a privileged pastime. Three separate measures resulted in a European hunting estate system that worked and these were:

1. Hunting reserves were established by the European aristocracy and Royalty to conserve areas of wilderness and wetland to facilitate their hunting activities and to enable agriculture to proceed in non-reserve areas.

2. The aristocracy enforced draconian punishments on those found poaching animals on these reserves resulting in mutilation, imprisonment, or death to the offender.

3. Animals were sustainably hunted on hunting reserves and either consumed on the estates, or sold to the villagers or the cities.

Today, after a thousand years of hunting, five hundred of these with firearms, we find that none of the European game species are extinct, in fact many are as abundant today as they were a thousand years ago. The decision to conserve areas of wilderness and wetland habitat on private estates, ensured that a reservoir of wilderness was isolated from the biggest agricultural and industrial revolution that mankind has known. Many of the ancient hunting estates still function as hunting reserves, whereas others have been converted to national parks.

How can anyone deny that the sustainable use of wildlife on the European hunting estates has not been a highly successful conservation strategy? Value was attached to the wildlife: the habitat was preserved; the fauna was protected from external hunting pressures and game populations were managed.

The International Recognition of Sustainable Utilisation

Major international conservation organisations such as the IUCN (International Union for the Conservation of Nature), held in Perth in 1990, the Biodiversity Conference held in Colombia in 1994, and the Ninth Conference of the Parties (9th COP), to CITES (Convention for the International Trade in Endangered Species of Fauna and Flora), held at Fort Lauderdale in 1994, all adopted sustainable utilisation as their major conservation strategy. It is something of a time warp for us to be sitting here considering the worth of sustainable utilisation of wildlife. The fact of the matter is that the world has passed us by and sustainable utilisation is now deeply entrenched as the most effective conservation strategy that we have: it is a strategy that has been adopted because of performance; it works.

Indeed, as a participant at the 9th COP at Fort Lauderdale, it was pleasing to note that major conservation issues were decided on the basis of sustainable utilisation and that when hunting was involved, support was even greater. This was no small conference; thousands of delegates representing 128 countries participated in the decision-making. This was a great victory for conservation and hunters, and a memorable defeat for the protectionists and animal liberationists.

A case in point is the South African population of the White Rhinoceros. Before the 9th COP this population had been listed as an endangered species on Appendix 1. A resolution was put forward which proposed that the status of this species should be changed to Appendix 2, so that hunting trophies could be sold and live animals could be traded between game ranches. The international support for delisting this species to facilitate these hunting operations was massive; the vote

was 60 to 2 in support of the resolution. Ironically, Australian newspapers carried the story that the protection status of the species had been increased.

The vote was no surprise to hunters, for it was the hunters who had saved this endangered species. Southern White rhinos were in danger of extinction due to poaching which had reduced the population to only 10 survivors on the Umfolozi Game Reserve in South Africa. Game ranches were used by the South African government as the basis for their conservation strategy. The White rhino population expanded to a level where trophy hunting recommenced on private properties in the early seventies to provide a revenue for the game ranches involved in rhino conservation. The population has increased to over 5,300 animals growing at a rate of up to 9.5% a year (unpublished South African Government submission to 9th COP 1994). Trophy fees charged for hunting southern White rhinos ranged from US$15,000 to US$25,000 for a mature bull. The direct monetary return from the animals and the policing system on the game ranches guaranteed the southern White rhino's survival. This is a classic example of conservation through sustainable utilisation. It is noteworthy that the endangered Black rhinoceros has been wiped out over much of Africa because of poaching. This occurred while the species was under the mantle of CITES Appendix 1 and national park protection. The African numbers crashed from 65,000 in 1970 to 2,500 in 1994. Seemingly at the last moment, 30 of the remnants of the Zimbabwean population of Black rhinoceros have been given by the Zimbabwean Government to a consortium of 16 game ranches at Humani in the south east of Zimbabwe. The game ranches involved cover some 860,000 acres of prime habitat. Once again, hunters are providing the Black rhino's last chance.

Sustainable utilisation works as a conservation strategy and for this reason alone it has been adopted by all major international conservation organisations.

Sustainable Utilisation Makes Wildlife Valuable

There are several key ingredients which operate together to make sustainable utilisation a successful conservation strategy. These are:

1. Value is placed on animals.
2. Habitat is retained.
3. Ownership of wildlife is given to people who own the land.
4. Wild populations are managed.

The key factor is that animals are given value. Consequently, the sale of a quota of these animals to hunters, or markets of some type, provides a direct monetary return to the people who own the land and the animals. The landowners thus have a direct incentive to keep the habitat on their land and not clear it. Advice is given to the landowners by government departments on what the carrying capacity of their land is, and on what a sustainable off-take quota might be. This simple model works because it provides a direct return from the consumer or hunter to the landowner. There is no finer example than the Zimbabwean CAMPFIRE scheme for a successful conservation strategy based on the sustainable use of privately owned wildlife.

Incidentally, the World Wide Fund for Nature (WWF), is a strong supporter of the CAMPFIRE scheme and has established similar schemes in a number of countries based on trophy hunting. Most significantly, the WWF has established an operation in Zambia involving the trophy hunting of Appendix 2 listed Black Lechwe. This is unambiguous evidence for the WWF support for sustainable utilisation as a conservation strategy; one would not expect them to countenance the hunting of threatened species if it was not sustainable.

Sustainable utilisation not only works for subsistence agriculture in Zimbabwe but for cattle ranchers too. Game ranches in Zimbabwe, Namibia and South Africa now dominate the conservation scene in southern Africa. Beef grazing operations are changing over to game ranching on a large scale; dispersing their herds and ripping out fence lines; fostering the native vegetation and managing the wild game population. This is not surprising when one considers the economics of the situation. A grazier who once obtained US$200 to US$300 for a steer is paid on a much grander scale for game. A hunter who might shoot 10 animals from 10 species over a 10 day safari on a game ranch will be paying the Safari operator (usually the rancher), US$400 a day for accommodation and services. On top of this, the trophy fee for each animal taken ranges from US$200 for a Warthog; to $800 for a Waterbuck; to $1,000 for a Greater Kudu; to $1,800 for a Sable Antelope; to $2,500 for a Leopard and $10,000 for an Elephant (usually only available on a 20 day safari at $800 to $1,000 a day). The game rancher receives a third level of payment in that the animal carcass is sold as butchered meat or biltong. All animals are shot within a government imposed quota. The monetary return from sustainable utilisation of wild game populations by hunting, far exceeds any other return from farming or non-consumptive wildlife tourism. It is for this very reason that countries throughout Africa are now switching over to sustainable use of wildlife by big game hunting as a conservation strategy. Protectionism fosters

poaching and loss of wildlife and this has been an utter disaster for conservation in those nations such as Kenya which abandoned hunting and adopted that strategy.

Sustainable utilisation also works as a conservation strategy for the wealthier nations. Thus, game bird shooting (grouse, partridge, pheasant, woodcock, snipe and waterfowl), in Great Britain, is one of the most expensive sports where fees of 1,500 pounds for a day's shooting are the norm. Countryside sports (fishing, game shooting, deer stalking and fox hunting), provide a major component of the British economy where in 1990, 1.4 billion pounds, i.e. A$3.5 billion, was spent on direct participation in countryside sports. If we include the indirect expenditure on these sports (i.e. subsidiary industries), a total of 2.7 billion pounds, i.e. A$6.75 billion, was spent (Cobham Resource Consultants,1992).

1. All of the game species are hunted sustainably.

2. Huge areas of habitat have been set aside for hunting and are intensively managed to this end.

3. Increased shooting pressure has resulted in an increased level of re-afforestation of farmland as farmers attempt to attract hunters.

The European hunting industry works because the wild animal populations are a valuable sustainable resource.

As a final note in this section I would like you to consider the plight of the world's tigers. These highly protected species are facing extinction because of land clearing and poaching for the Asian pharmaceutical trade. Although there are between 4,600 and 7,400 tigers remaining in the world, tiger populations are in a general state of decline and have fallen by 95% this century. Indeed, much of this decline has occurred while the tigers have been protected locally and under CITES Appendix 1 listing. These magnificent animals face a bleak future under the present system, where the only value attached to them is when they are dead. I put it to you as a hunter and a conservationist that the only hope for the tigers of this world is to make them valuable as live animals. That is, to allow hunting of male tigers under a strict quota system with a high trophy fee in the order of from US$50,000 to US$250,000 per animal. By adopting this approach, habitat destruction would be immediately reduced and the people in the villages who ultimately own the animals would be out in battalions protecting them from poachers and eliminating poaching as a culturally acceptable activity. Those

normally opposed to tiger conservation would be getting the trophy fee. Thus, by sacrificing a few animals the survival of the species would be guaranteed.

The protectionists and animal liberationists appear to be more interested in philosophical and political correctness than in conserving the tigers. If you think that these views on tiger conservation are extreme and unworkable, I would like to point out to you that the head of the IUCN cat specialist group, Peter Jackson, shares the same view as mine. In regard to the 400 surviving Siberian tigers, Jackson has stated that the only way to ensure the tigers's survival was by giving it an economic value and the best way to do that was through hunting (Bonner 1993 p242: from "CAT NEWS" published by the IUCN Species Survival Commission, January 1990).

Animal Liberation - Anti-Conservation

At this conference we have been debating whether sustainable utilisation of wildlife resources works as a conservation strategy. We are doing so despite the effective operation of this strategy for a thousand years and numerous examples of its effectiveness in animal conservation. Thus, there is no questioning the fact that the vast majority of game species are increasing in numbers throughout the world today under a sustainable utilisation regime.

Here, we are deciding whether this proven strategy should be dispensed with to be replaced by blanket protectionism, a scheme which has not worked in the past. Indeed, the extinction of many species of Australian fauna and the endangering of many others has occurred under state and federal government protection.

I question why we are countenancing the protectionist views of animal liberationists at this conference, views which their media spokesman tell us are opposed to population and habitat management? The animal liberationists opt for the 19th century Malthusian approach, where nature is left to take its course; where overpopulation destroys the habitat; where animals die a lingering death; where biodiversity is eliminated. Do the animal liberationists want to repeat the destruction of Kenya's Tsavo National Park, where in the late 1960s, 40,000 elephants ate themselves out of a habitat and destroyed the park, themselves, and unfortunately did even more damage to the Black Rhinoceros population in that area (see Beard 1965 for graphic photographs of the Tsavo disaster)? How animal liberationists can juxtapose such cruelty with their touted humane approach to wildlife is a logical nonsense.

The animal liberation approach to conservation by letting nature take its course, does not work, because habitat boundaries are no longer infinite, they are finite and surrounded by man and agriculture. Destruction of habitat due to animal overpopulation can nowadays be permanent. Population management by sustainable utilisation is the only solution to long term conservation.

References

Beard, P. 1965. The End of the Game. Viking Press, New York.

Bonner, R. 1993. At the Hand Of Man. Simon and Schuster Ltd, London.

Cobham Resource Consultants. 1992. Countryside Sports: their Economic Conservation Significance. Published by the Standing Conference on Countryside Sports. The College of Estate Management, Reading, Great Britain.

TORRES STRAIT CULTURE PROMOTES SUSTAINABLE USE OF WILDLIFE

by Charles Missi,
Project Officer, Aboriginal Wildfood Project,
Wildlife Management International Pty Ltd,
Karama, Northern Territory

Charles Missi is an indigenous Australian who has an intimate understanding of Torres Strait Islanders, their culture, environment and politics and a lifetime commitment to protect and conserve their natural resources. The Aboriginal Wildfood Project which is assessing the use of wildlife by indigenous people in the Northern Territory, is being carried out under the direction of Dr Grahame Webb, an Australian research zoologist who is widely recognised as one of the world's leading authorities on crocodilians and the sustainable use of wildlife.

Torres Strait Islanders want to be independent from foreign cultures and to control their own lives, traditional lands and marine resources. This is an understandable desire of any indigenous population whose political system and governments have been dominated by a non-indigenous population over a long period of time. Two hundred years of social, economic, political and cultural exploitation and suppression is too much to bear. During this time, we have been in fear of losing our culture, identity, traditional beliefs and aspirations (Kehoe-Forutan 1988). The subject of this conference is intimately connected to these fears.

The Torres Strait Islands are on the periphery of Australia, both geographically and politically. Most people do not recognise us as a race in our own right, quite separate from Australian Aborigines.

Prior to 1988, we were not even officially recognised by the Government. For example, in the 1970s, the Whitlam Government proposed to shift the international border between Australia and Papua New Guinea, dividing the Torres Strait between the two nations, without the knowledge or consent of our people. We were greatly alarmed and successfully lobbied against the proposal; but it only served to reinforce the view that we were expendable as a people and culture, that we could not rely on outsiders.

In 1966 Australia signed two Human Rights Treaties - the International Convention on Civil and Political Rights and the International Convention on

Economic, Social and Cultural Rights. As a signatory to these treaties Australia's Governments are committed to uphold the rights of its indigenous people: democratic and human rights such as *"to participate in government, personal liberty and security, protection against unemployment, cultural freedom, family security, food, health and adequate standard of living"* (AIDAB 1992).

We firmly believe that any decision-making processes, policies, political statements, public actions or even inferences by non-indigenous people that denigrate our culture, to deny us basic human and democratic rights, should be recognised for what they are - ignorant and racist actions. This was clearly demonstrated when a spokesperson for the RSPCA in Brisbane earlier this month (September, 1995) tried to rally support, on a talkback radio program to prevent Aboriginal and Torres Strait Islander peoples using their traditional methods for killing wildlife, because the RSPCA considered them inhumane.

In the past we harpooned dugongs from large canoes or wooden platforms erected where they would feed on seagrass at night, during low tides. Turtles were caught by hand while they were mating in the water; on the beach after their eggs were laid; with tethered sucker fishes (remoras) or harpooned. The sharing of fish, dugong and turtles within our kinship structures was, and remains, a traditional custom which gives meaning to our existence. Today, we hunt those animals with the same implements using aluminium dinghies with outboard motors rather than canoes (Becket 1987; Finch 1977; Marsh and Saafield 1990; Moore 1978; Nona 1990).

In 1985 the Torres Strait Treaty recognised the rights of traditional inhabitants of the Torres Strait to take dugongs and turtles without restrictions (Harris and Nona 1995). As lamb and beef are to mainland white Australians, so are dugong and turtle to Torres Strait Islanders (Moore 1987; Harris 1995).

We live in harmony with the sea and we have an intimate understanding of the effects of the winds, tides, seasons, moon and sun on the fish stock, turtles, dugongs, sea birds and other sea creatures (Moore 1978; Sharp 1992). We have used this understanding to harvest these creatures in a sustainable manner for at least 60,000 years (CLC & NLC 1995).

Our culture and traditions demand that we do not deplete our marine or non-marine wildlife resources because we need them to survive. Our laws enshrine the very essence and spirit of sustainable utilisation of wildlife.

Our land, sea and people

The Torres Strait is an island complex located in the waters separating the tip of Cape York Peninsular from Papua New Guinea. The region is a matrix of shallow coral reefs with large sea grass communities (Beckett 1987) and one of the richest areas in marine biodiversity in the world (Lawrence 1990; Miller and Limpus 1990; William and Staples 1990).

There are 150 islands in the Torres Strait which have a great diversity of forms, from ancient volcanic peaks, to basalt rocks, to coral cays. People inhabit 18 islands, and two communities - Seisa and Bamaga (about 1,200 people) - are located on the northern tip of Cape York. Some 6,842 people inhabit the Torres Strait region and an additional 8,334 Islanders now live on the mainland (O'Rouke 1988).

Our people have many links with Papua New Guinea. The eastern Torres Strait Islander people speak a language closely related to that of the Kiwai people of the Fly River delta in Papua New Guinea. People on the western islands speak the Kala Lagaw Ya language which has links with the mainland Aboriginal people of Cape York (Beckett 1987; Singe 1979).

We are primarily a Melanesian race of people, although we have integrated with other peoples (Foley 1982). Our values, beliefs and aspirations are different from non-indigenous Australians. We have a rich and diverse culture we must preserve, but at the same time we want to use our natural resources and our knowledge to develop the skills and infrastructure needed to survive and prosper in the modern world. We want a sustainable economic base linked to our renewable resources, and we want the same levels of social and cultural independence that all people want (Mulrennan and Hanssen 1994).

Historically, Torres Strait Islanders were great traders. Our forefathers travelled in big sailing, dual-outrigger canoes, trading many things, such as canoes, drums, cassowary feathers, bows and arrows and wives, etc., with the Papua New Guinea people of the Fly River basin (Beckett 1987; Sharpe 1993). Similar ties and arrangements were established with the Aboriginal people of Cape York (Moore 1978).

We would like to build on our traditional trading culture, using our knowledge of natural resources to develop self-sustaining industries that support our people culturally and economically. We want to develop marine-based industries which are economically sustainable - finfish, clams, oysters, pearl shell, trochus, crocodile,

turtle and any other economically valuable, renewable marine species - not only using traditional methods but modern techniques such as mariculture, that can increase harvest levels without detriment to the environment.

Of very strong interest to us is sea turtle harvesting and farming. When farming was tried previously in the Torres Strait, we gave it every support possible. Unfortunately it was not successful due to the technology of the day. Now the technical problems of farming have been largely solved. It is a profitable and sustainable form of resource use in Cuba and the Cayman Islands. The Cayman Island Turtle Farm is highly successful and has helped to develop the economy of that island. At the same time it has generated conservation benefits through research and the release of farm raised juveniles into the wild (Cayman Turtle Farming 1983).

There is every reason to believe that turtle farming in the Torres Strait could be economically sustainable; it is certainly culturally appropriate and environmentally friendly. Respect for our culture, good science, traditional knowledge, effective management and proper marketing are needed to ensure the success of turtle-based industries, or an exploitable industry based on our marine resources.

We, more than most others, realise that the maintenance of the marine environment is critical - waters must be kept in an optimum condition to ensure marine-based industries are sustainable. However, we cannot ensure this at the present moment. We no longer control our waters. They are international channels for passing ships and freighters. Prawn trawlers regularly crisscross the Torres Strait waters exploiting our natural prawn stock and other marine species. This has had, and is having, a significant impact on the marine habitats and ecosystems. Large volumes of rubbish are dumped into the sea: plastic containers, plastic bags, discarded nets, sewerage, ballast water, oil and diesel (Mulrennan 1993).

In 1972 the "Oceanic Grandeur", an oil container ship struck a rock in the Torres Strait international passage, spilling oil which polluted and destroyed large numbers of marine creatures and sea birds. It appears that this oil adversely affected the cultured pearl industry in the Torres Strait Islands (Queensland Department of Harbours & Marine 1970). Toxic effluent from the Fly River may also be a problem. We fear such things, but we are not really in a position to evaluate them objectively for ourselves.

The Torres Strait Treaty was meant to protect our interests, and customary and traditional rights. It has not done so. Unfortunately, while it appears good on paper, it is not good in practice: there are many obvious flaws and inconsistencies. Non-indigenous commercial fishermen exploit the natural resources, whereas the commercial advantages that flow through to us are minor (Mulrennan 1993). Is this what anybody wants?

Over the past 60,000 years we have successfully managed our natural environment. We have no need to study the non-indigenous concepts of the precautionary principle, intergenerational equity, conservation of biodiversity and sustainable use of wildlife. For us, they are already incorporated within our culture. We have a holistic approach to life: the environment and our culture are one and the same. We have a lifetime commitment to protect and conserve our natural resources.

Yet, we are prevented from using our traditional skills and knowledge for commercial purposes by people who do not understand us and who are struggling even to come to terms with the concept of sustainable use of environmental resources. The values and laws of non-indigenous people greatly constrain our activities, yet if they tried to help us with a positive attitude they could assist us greatly. Non-indigenous people have no right to interfere with our customs, nor use our knowledge and resources without consent.

Acknowledgements

I wish to thank the Bureau of Resource Sciences, Wildlife Management International Pty. Ltd. and the Department of Employment, Education and Training for providing funding for studies into wildlife use and management. Michael Vardon, Greg Williams, Marcia Langton and Grahame Webb all assisted with the writing of this manuscript.

References

AIDAB (Australian International Development Assistant Bureau). (1994). "Towards a Sustainable Future, Ecological Sustainable Development through Australia's Development Co-operation Program". AGPS: Canberra.

Beckett, J. (1987). "Torres Strait Islands". Cambridge University Press: Cambridge.

Cayman Turtle Farm Ltd. (1983). "Cayman Turtle Farm, Grand Cayman". Cayman Island: British West Indies.

CLC & NLC (Central Land Council & Northern Land Council). (1995). "Our Land, Our Life, Aboriginal Land Rights in Australia's Northern Territory". IAD Press: Darwin.

Department of Harbours and Marine, Queensland (1970). Report on the grounding of the oil tanker Oceanic Grandeur in the Torres Strait on 3rd March 1970 and the subsequent removal of oil from the waters: 27 pp.

Finch, C. 1977. "The Torres Strait Islands: Portrait of a Unique Group of Islanders". The Jacaranda Press: Brisbane.

Fisk, E.K. (1975). Volume VI. Policy Option in the Torres Strait, The Torres Strait Islander. Research School of Studies Department of Economics, Australian National University: Canberra.

Foley, J.C. (1982). "An Illustrated History of Thursday Island". Watson Ferguson and Co.: Brisbane.

Harris, A. (1995). "Strait Talking on Dugong and Turtles". CSIRO Fisheries: Cleveland, Queensland.

Harris, A.N.M. and Nona, H.B. (1995). The catch of dugong and turtles in Torres Strait, Australia. Biological Conservation (submitted).

Kehoe-Forutan, S.J. (1988). Torres Strait Independence - A Chronicle of Events. Research Report No. 1, Department of Geographical Science (Geography, Planning, Surveying).

Lawrence, D. (1990). "Sustainable Development for Traditional Inhabitants in the Torres Strait Region: The Torres Strait Baseline Study". Watson Ferguson and Co.: Brisbane.

Marsh, H. and Saafield, K. (1990). The status of Dugong in Torres Strait. In "Sustainable Development for Traditional Inhabitants of the Torres Strait Region". Watson Ferguson and Co.: Brisbane.

Miller, J.D. and Limpus, C. (1990). Torres Strait marine turtle resources. In "Sustainable Development for Traditional Inhabitants of the Torres Strait Region". The Torres Strait Baseline Study, Watson Ferguson and Co.: Brisbane.

Moore D.R. (1978). "Islanders and Aborigines at Cape York: An Ethnographic reconstruction based on the 1848-1850 "Rattlesnake Journal of O.W. Brierly and Information he obtained from Barbara Thompson". Dominion Press: Melbourne.

Mulrennan, M. (1993). Towards a Marine Strategy for Torres Strait (MaSTS). ANU, NARU, TSICC: Darwin.

Mulrennan, M. and Hanssen, N. (1994). "The Marine Strategy for Torres Strait Policy Directions, with the Islander Co-ordinating Council". ANU, NARU, TSICC: Darwin.

Nona, H.B. (1990). Torres Strait Islanders and Our Turtles. Project of the Australian Marine Turtle Concentration Workshop, Seaworld, Nara Resort, Gold Coast, 14-17 November.

O'Rourke, D.J. (1988). "Report of the Interdepartmental Committee on the Torres Strait Islands" Department of Aboriginal Affairs: Canberra.

Sharp, N. (1992). "Footprints along Cape York Sandbeaches". Aboriginal Studies Press: Canberra.

Singe J. (1979). "The Torres Strait, People and History". University of Queensland Press: Brisbane.

William, G.C. and Staples, D.J. (1990) Australia's Fisheries Research in the Torres Strait Protected Zone. In "Sustainable Development for Traditional Inhabitants of the Torres Strait Region". The Torres Strait Baseline Study, Watson Ferguson and Co.: Brisbane.

AN ABORIGINAL PERSPECTIVE ON THE SUSTAINABLE USE OF WILDLIFE

by Miriam Cleary,
Aboriginal Wildfood Project,
Wildlife Management International Pty Ltd,
Karama, Northern Territory

Miriam Cleary is involved in the Aboriginal Wildfood Project which is assessing the use of wildlife by indigenous people in the Northern Territory. She has a great knowledge and understanding of the culture of her people and all aspects of their religion, tradition and customs.

Preface

I speak as an individual from the diverse group of people known as Australian Aborigines.

In reference to the term *"Aboriginal Australian"*, I use it to indicate Aboriginal people from the mainland *only*. I find I cannot speak on behalf of the Torres Strait Islander peoples, although I am aware that they share similar concerns, for the future of our country and of their people's culture, tradition and health. The term "Indigenous Australian", includes both Aboriginal and Torres Strait Islander peoples. When I use *our, us* or *we* I am referring to myself and other Aboriginal Australians.

Introduction

Indigenous Australians have used and managed wildlife for tens of thousands of years. An intimate knowledge and understanding of nature has developed over this time. All aspects of our life are entwined with nature: religion, culture, tradition, customs, family, recreation, hunting, gathering, etc. Indigenous Australians have a lot to teach others about wildlife management and use. Co-operation between indigenous and non-indigenous Australians would result in a better understanding of this knowledge and increase community respect for it. Unfortunately, this is not evident today.

Lack of respect and ignorance of our needs are reflected in many attitudes, laws and actions of non-indigenous people. Wildlife is a classic example. Laws which govern the use of wildlife restrict hunting and gathering on much of our land.

Through their laws, non-indigenous Australians limit our practices, albeit unwittingly. Our traditional hunting methods are not cruel or inhumane by our standards - there are reasons for everything we do. That others may not understand them is their problem, not ours. All food has meaning. The laws that govern Aboriginal society are strict and include many rites and observances related to food. Some foods are not eaten at certain times of the year. Each food has ceremonial or religious importance. For instance, some animals and plants are totemic relatives of every group of Aborigines. These may not be killed or eaten by one tribe, although they may be considered legitimate food by another tribe not far away.

Hunting game, particularly large animals such as kangaroos, wallabies, turtle, dugong and emus, has always been important to Aboriginal men. Meat is a significant part of Aboriginal diet. Hunting animals and all aspects of the hunt itself are entwined with religion and custom. Procedures for killing, preparing, cooking and sharing all meats are set down according to laws established by individual tribal ancestors (eg. Altman 1987; Barker 1988) and are deviated from at an individual's own risk.

Aboriginal people experience the land and its seasons while learning directly about it from others who have collected the wisdom and knowledge from our ancestors. Until recently we have not needed to explain why or how we experience or do things. In any case, it is extremely difficult, if not impossible, to explain to non-indigenous people the concepts that we have in terms which are familiar to them. For example, when we look at the land or an ecosystem, we see many things. We see beyond what is physically there. Every living thing has a reason for being and plays an important role in Aboriginal society. This is a matter of survival for many Aboriginal people.

Indigenous people are struggling to adapt and understand non-indigenous cultures and values. At least we are trying, but this does not seem to be reciprocated. Our cultures are fundamentally different and these differences are obvious and significant.

We as people do not force our culture or traditions upon others, yet we have been forced to accept and adopt many aspects of western culture. I hope non-indigenous

people will realise this and respect our position, learn to understand and appreciate our culture, traditions, religion and our right to make decisions about our land and wildlife. Perhaps history has already shown that our approach is much more sustainable than many alternatives. Mutual respect of traditions is needed, rather than the domination of one culture over another.

Decisions made by non-indigenous people are still altering the course of our lives and interfering in the way we live or wish to live. We see many decisions made as being morally wrong and they cause us great concern: wildlife use is one example, and this forum is not an exception. Indigenous Australians have much knowledge of the topic under discussion, and may be directly affected by political decisions relating to wildlife use that may stem from it. Yet, we are barely represented here. Non-indigenous Australians seldom invite indigenous people to speak about such issues despite their direct interest in the outcomes. Ignorance is often to blame, but it is not an excuse.

Sustainable Use of Wildlife

Many Aboriginal people, including myself, want to become further involved in the sustainable and commercial use of wildlife. Such involvement builds on our traditional knowledge and skills and provides income and employment opportunities more culturally appropriate than many other commercial activities (eg. mining, tourism and pastoralism).

Why shouldn't we, as people, be looking at our natural resources which we know and understand, to generate income and employment for the benefit of our people?

The commercial and sustainable use of wildlife could benefit indigenous Australians by providing income and employment opportunities, improved health, education and lifestyles for Aboriginal Australians (Wilson et al. 1992; Bomford and Caughley 1996; Vardon et al. 1996).

Aboriginal and Torres Strait Islanders have shown real interest in jobs involving the harvesting, processing, selling, transportation, managing, farming, and marketing of wildlife. Given the opportunity, knowledge and education, this interest may be able to be turned into a reality. This could enhance the quality of life for Aboriginal and Torres Strait Islander people, generate increased levels of economic independence, and, most importantly, create pride in our achievements.

Aboriginal and Torres Strait Islanders are already involved in some commercial wildlife operations (O' Brien and Meek 1992; Wilson et al. 1992). For example:

Crocodile production (Webb et al. 1996)

Edward River Crocodile Farm Pty. Ltd., Cape York Peninsula, Queensland, is a private company owned by the Pormpuraaw. In 1969 a research project was established there to conserve the then unprotected saltwater crocodile, develop farm husbandry methods suited to raising large numbers of crocodiles in captivity, and above all, to provide employment opportunities for the local Aboriginal community, when virtually none existed.

Redbank Crocodile Farm, Cairns, Queensland. In September 1993, the Redbank Crocodile Farm was opened. The primary objective of the company has been to provide training and meaningful employment for Aboriginal people, who comprise over 85% of the company's permanent staff.

Emu farming (Wilson et al. 1992)

Nangganawilli Community Inc., Wiluna, Western Australia. Here the Aborigines, represented by the Wangka Wllurrara Regional Council, on Eyre Peninsula, on the far west coast, inhabit some of Australia's most difficult farming land. To compensate for the nature of the land, they are using a native bird and adopting an approach with strong links to their traditional way of life. Their struggle for self-determination is slowly replacing the old welfare mentality.

Mutton birding (Brown 1992; Skira 1992)

The Tasmanian mutton bird occurs in the islands of Bass Strait, and is one of the most abundant birds in Australia. The species was eaten in Tasmania and on the Australian mainland by Aboriginal people in prehistoric times, but was limited by seasonal and technical factors, and by cultural choice. Hunting and collecting mutton birds is now economically important for the descendants of Aboriginal Tasmanians, and for many non-Aborigines.

The management of National Parks

Aborigines co-manage two of Australia's most famous National Parks (Kakadu and Uluru), as well as several others.

Many other species could be used sustainably to generate income (eg. Magpie-geese, flying-foxes and marine turtles). But for sustainable use programs to be achieved successfully by indigenous people, several things are needed:

1. Indigenous people need to learn more about business concepts and skills;

2. Non-indigenous people need to learn to accept and respect Aboriginal culture and values;

3. Non-indigenous people must realise that indigenous enterprises are at the cross-roads of two cultures.

It is a learning process for both. We as Aboriginal people and you as non-indigenous people. A balance needs to be found but this can only be achieved if indigenous people's views and values are represented at all levels of decision making.

We do not want token representation at meetings about wildlife where the agenda is already decided. We need to be part of the process from start to finish.

Conclusion

I want to continue my traditions of hunting and gathering for many years to come. I want to pass the knowledge of how to do this to my children, so that they in turn can pass it on to their successive generations. To prevent unsustainable depletion of the land and its resources all Australians will need to work together. The knowledge of both cultures can and should be able to sustain the environment and its peoples.

There has been increased interest in indigenous utilisation of flora and fauna in recent years (eg. O'Brien 1992; Wilson et al. 1992, Bomford and Caughley 1996; Vardon et al. 1996) This indicates that non-indigenous people are aware of knowledge and skills and how they may be used in the sustainable use of the environment. But how many people have this view? How many people at this conference are opposed to anyone killing any animal? People like you and I need to encourage progress in the technology of using wildlife sustainably. This will ensure flora and fauna are there for future generations.

The issues surrounding wildlife and its use are extremely important to Aboriginal people. The right to use our wildlife resources in the way we see fit is fundamental to our culture. Why are they under threat by non-indigenous people who seem to value wildlife more than our people? We should not be forced to plead for our traditional rights to use wildlife. Aboriginal people are who we are, and what we are, through our culture and tradition. An essential part of that

tradition relates to wildlife and wildlife use. To limit our use of wildlife to satisfy the whims of people who are opposed to the use of any wildlife, is to kill our culture.

Acknowledgements

The Bureau of Resource Sciences and Wildlife Management International are sponsoring research into the use of wildlife by Aboriginal people in the Northern Territory while the Department of Employment, Education and Training provided the funds which enabled me to attend the conference. Many thanks go to Grahame Webb, Michael Vardon, Greg Williams, Sue Stanton and Charles Missi for assistance in writing this paper.

References

Altman J. C. (1987). "Hunter-gatherers Today: an Aboriginal Economy in North Australia". Australian Institute of Aboriginal Studies: Canberra.

Barker, R. (1988). Traditional Aboriginal land use in the Borroloola Region. In "Traditional Ecological Knowledge: Wisdom for Sustainable Development", ed. by N.M. Williams and G. Baines. ANU: Canberra.

Bomford, M. and Caughley, J. (Eds.) (1996). "Sustainable Use of Wildlife by Aboriginal Peoples and Torres Strait Islanders". Bureau of Resource Sciences. AGPS: Canberra. (in press).

Brown, H. (1992). Memories of mutton-birdin' our way. Pp. 3-6 in "Wildlife Use and Management: Report of a Workshop for Aboriginal and Torres Strait Islander People", ed. by P. Meek and P. O'Brien. AGPS: Canberra.

Meek, P. and O'Brien, P. (Eds.) (1992). "Wildlife Use and Management: Report of a Workshop for Aboriginal and Torres Strait Islander People". AGPS: Canberra.

Skira, I. (1992). Commercial harvesting of short-tailed shearwaters (Tasmanian Mutton-bird). Pp. 7-18 in "Wildlife Use and Management: Report of a Workshop for Aboriginal and Torres Strait Islander People", ed. by P. Meek and P. O'Brien. AGPS: Canberra.

Vardon, M.J., Missi, C. and Cleary, M. (1996). Commercial wildlife use: potential benefits and opportunities for indigenous Australians. In Proceedings of Ecopolitics IX Conference (pp 84-87), ed. by R. Sultan. Darwin, 1-2 September 1995. Northern Land Council: Darwin.

Webb, G.J.W., Missi, C. and Cleary, M. (1996). Sustainable use of crocodiles by Aboriginal people in the Northern Territory. In "Sustainable Use of Wildlife by Aboriginal People and Torres Strait Islanders" (pp 176-185), ed. by M. Bomford and J. Caughley. Bureau of Resource Sciences - AGPS: Canberra.

Wilson, G., McNee, A. and Platts, P. (1992). "Wild animal resources: their use by Aboriginal Communities". AGPS: Canberra.

SUSTAINABLE USE OF REPTILES AND AMPHIBIANS

by Hal G. Cogger,
Former Deputy Director,
Australian Museum, Sydney

Hal Cogger who recently retired as Deputy Director of the Australian Museum, has a keen interest in and knowledge of Australian and Pacific biodiversity and conservation. He is a world-renowned herpetologist and a member of the International Commission for Zoological Nomenclature. His best known book is "Reptiles and Amphibians of Australia", first published in 1975 and being revised for the fifth time.

Preamble

The following paper is almost a direct transcript of the one presented at the seminar. Initially I was convinced that I should delete the opening comments as being irrelevant to a published version. They were inserted in my introduction after the first day because of my perception that much of the discussion involved levels of illogicality and hypocrisy that I found, both as a member of my species and as a biologist, intellectually dishonest and ethically offensive.

Too often in the discussion, the fate of one or a few favoured organisms was considered to be more important than the fate of thousands or even millions of other organisms. Further, some of those who were passionately opposed to exploiting animals in any way were, by their conscious actions or adopted lifestyles, actively contributing to the killing of animals and the loss of regional and global biodiversity.

Consequently I apologise to the reader for what might well appear as moralistic or self-righteous preaching in the written text but which seemed appropriate at the time in a live and lively public debate.

Introduction

I had originally prepared a somewhat academic paper for this symposium, one in which data were to be presented suggesting that many current attitudes to the "use" of wildlife were not really based on a desire to minimise stress and suffering

to animals in general and to ensure the survival of species, communities and ecosystems. Rather, they are often based on a clear preparedness, or even an active desire, to see some species flourish and be free of stress and suffering at the expense of others.

I proposed to demonstrate, taking examples from the reptiles and amphibians on which most of my work is based, that if the former objectives were to be realised, then current priorities in allocating funds and human resources to wildlife conservation are seriously flawed.

So as to leave the reader in no doubt as to my philosophical and moral/ethical attitude to the utilisation of wildlife, I should state my position at the outset.

First, I was appalled by the lack of honesty in some of the seminar discussion. Let us be quite clear: the standard of living and the rate of consumption being enjoyed by every member of this audience is at the direct expense of at least half of the world's population of *Homo sapiens* and is demonstrably resulting in the unsustainable loss - and by loss I mean deaths, just like being shot, clubbed or stomped on - of untold billions of animals and the permanent removal of them and their potential successors from planet earth. Only when this is acknowledged can we hope to minimise or eliminate hypocrisy in our ethical arguments.

Second, I believe that loss of biodiversity is probably the greatest problem facing our world, because while biological resources are intrinsically renewable, and we depend totally on them for our own survival - once lost they're lost forever. And once lost, their contribution to ecosystem functions and services is also lost forever.

In the longer term, I'm sure that Gaia will cope. But I believe that halting the rapid rate of decline of both biological and ecological diversity should take precedence over the welfare and fate of individual organisms, if we are to avoid catastrophic impacts on future generations of our own species. This does not mean that I am other than passionately opposed to the unnecessary infliction of pain and death on animals; I find the killing of animals for sport abhorrent.

Third, I believe equally passionately that the more we proscribe physical contact between people and animals, the more we increase society's indifference to the intrinsic worth of animals and to their welfare and fate.

Fourth, I acknowledge that many calumnies are perpetrated under the guise of ecologically sustainable development - a term which many others have correctly pointed out is an oxymoron. But system imperfections are part of everything we do in life. We don't decide *not* to see a doctor when we are ill because some are incompetent, or *not* call the police in an emergency because some are corrupt. Ecological sustainability is the key to global survival of much of the earth's biota.

Consequently the question is not whether ***all*** of those who seek to exploit wildlife are honorable and concerned with high standards of animal welfare, but whether most are. And there is no doubt that some animal utilisation projects carried out with honourable and honest intent and using the best information available, have later been shown to be unwarranted or without merit.

But a fundamental issue for our species is whether the exploitation of wildlife, even if it doesn't lead to the long-term decline in numbers of the species or loss of genetic diversity, is to be considered an acceptable activity.

When society makes that decision in any particular case, the criteria which it applies usually fall into one or more of four broad categories:

ETHICAL criteria: do animals have any rights other than those which we humans deign to confer on them? I believe that they don't, because "animal rights" is a human construct and so can only be considered in human terms.

ANIMAL WELFARE criteria: if wildlife is to be utilised, then our western society (but not a lot of others) properly demands that the utilisation process must be made to meet the highest standards of animal welfare, involving minimal stress and suffering. In animal welfare terms, there is no fundamental difference between killing a koala and killing a rabbit.

BIOLOGICAL/ECOLOGICAL criteria: in this case, the issue is sustainability and what we mean by sustainable: keeping things at past or present levels? Some arbitrary level? Are declines acceptable, and if so what is an acceptable rate or level of decline? What population size and range is necessary to maintain a species and its full range of genetic diversity and is this the level below which "use" is unacceptable? Or conversely, what amount of genetic diversity are we prepared to lose? And if we are prepared to sacrifice one species to conserve another, what criteria do we use to identify the winner?

POLITICAL criteria: these are the most potent criteria and ultimately determine whether or not sustainable use of wildlife will be allowed to continue or increase. They are also the ones which are least amenable to logical or rational argument.

To sum up my own position, I have no philosophical objection to the concept of sustainable use of wildlife, provided that society establishes appropriate caveats on how we define and measure sustainability and the standards of animal welfare that must be adhered to. And also provided that any particular action doesn't contribute to an overall decline in biological and ecological diversity. I certainly don't believe that animal welfare considerations should be the determinant of conservation priorities. I am not prepared, without a fight, to see species decline and disappear just because some animals are killed or ill-treated in the process of effective conservation management.

And finally, I need to reiterate that the remainder of this paper applies only to reptiles and/or amphibians, and not necessarily to any other groups of animals, even though the principles and issues apply more widely.

The utilisation of reptiles and amphibians as a threat to species or ecosystems

Australia has a rich and diverse reptile and amphibian fauna. Including our island Territories, 799 species of reptiles and 209 species of frogs are currently recognised from Australia. These are now protected by legislation (of varying quality) in all States and Territories, and there is virtually no legal trade in reptiles and amphibians within Australia (except for limited exchanges between zoos, scientific intstitutions and universities and some registered individuals). Notable exceptions are crocodiles and sea snakes, in which significant trading occurs for food and/or skins.

At the Federal level, the export of all native animals (except for a few commercial species of fishes and crustaceans) is totally prohibited. Permits to export are normally issued only to researchers and larger zoos. Very substantial resources go into policing these laws, and there are currently calls for a much tougher and expanded effort to police both internal and external trades in reptiles, amphibians and other animals.

Consequently, with the few exceptions noted above, all international trade (to whatever extent it occurs) in Australian reptiles and amphibians is illegal.

Many claims have been made by Federal agencies and conservation organisations that the illegal trade in Australia reptiles is significant to the point that it has implications for the conservation of the illegally traded species. This claim appears to be based on three assumptions: that the specimens intercepted by regulatory agencies represent only the tip of an iceberg, that Australian reptiles command high prices on overseas markets, and that the specimens ***publicly*** traded overseas represent only a tiny proportion of the total trade. No evidence has been produced to support these claims, and most of the species which are intercepted are common and widely distributed.

The preceding paragraph is not intended to imply that the illegal trade in Australian reptiles should be ignored. Rather, my thesis in this paper is:

(a) that if data suggest that trade (legal or illegal) in particular species is leading to the decline of those species, then we should target our enforcement effort on those particular species, and as close to the source of supply as possible; and

(b) that except for those species identified in (a) above, the contribution of trade to the decline of our remaining reptiles and amphibians is insignificant compared with other processes threatening the Australian herpetofauna. Conservation would be better served by directing scarce resources away from increased policing to targetted, *in situ* conservation of threatened populations and communities.

Cogger et al. (1993) published a National Action Plan for Australian Reptiles which had been carried out under a contract from the Australian Government. In the course of preparing this Plan we carried out national surveys and conducted workshops, identified the major repositories of information, determined what new information is needed and who is best able to supply it. The purpose of the Plan was to identify and *rank* Australia's most threatened reptiles, and to *develop* and *cost* recovery plans aimed at halting their decline and ensuring their survival.

But preparing the Plan made us realise just how little we knew about these species, from basic issues such as where do they occur to critical management issues such as their occurrence in the reserve system, habitat requirements and their reproductive biology.

In all, some 204 species, subspecies or geographically-discrete populations were nominated for threatened status, of which we eventually recommended that 11

warranted *endangered* status, 41 warranted *vulnerable* status, and 152 were classified under the IUCN category of *rare or insufficiently known.*

Equally importantly, the exercise also raised serious questions about priorities, cost-effectiveness of existing conservation programs, and whether our basic approach to reptile conservation in Australia is effective: that is, are our priorities right? Are we getting value for the small number of dollars being invested in reptile conservation? Are we making the best use of our available resources, especially our human resources? And most important, are our existing programs actually working?

Globally, the legal trade in reptiles and amphibians in the beginning of the 1990s for skins, food, medicine and captive keeping was estimated by CITES to be about 11 million individuals. Of this legal trade, almost 90% derives from specimens taken for their skins, and of this massive skin trade, more than 85% is based on fewer than a dozen species (**Table 1**).

TABLE 1: Species accounting for >85% of international reptile skin trade Annual trade: 1984-90	
Tupinambis spp.	2,200,000
Ptyas mucosus	1,500,000
Varanus salvator	1,400,000
Caiman crocodylus	1,200,000
Python reticulatus	570,000
Varanus niloticus	500,000
Cerberus rhynchops	500,000
Homalopsis buccata	290,000
Acrochordus granulatus	172,000
Acrochordus javanicus	157,000

While it is difficult to estimate the size of the illegal trade in reptiles, most of that trade emanates from developing countries where controls are generally poor. Consequently, it is probably reasonable to assume that the illegal trade is at most double the legal trade - say about 22 million, resulting in a total trade, globally, of about 30 million specimens.

We then have to ask, in determining priorities for conservation action to conserve biological diversity, where does the direct utilisation/exploitation of animals,

including reptiles and amphibians, fit on the scale of major causes of biodiversity loss?

The Global Biodiversity Strategy (Anon., 1993) cites six major causes of biodiversity loss, of which over-utilisation is one of the six; note that utilisation *per se* is not considered a contributor:

- unsustainably high rate of human population growth and natural resource consumption;
- narrowing spectrum of traded products from agriculture, forestry and fisheries;
- economic systems and policies that fail to value the environment and its resources;
- inequity in ownership, management and flow of benefits from use and conservation of biodiversity;
- deficiencies in knowledge and its application; and
- legal and institutional systems that promote unsustainable exploitation.

All of these mechanisms are at work in most parts of the world, including Australia.

The same Global Biodiversity Strategy cites six major processes *threatening* biodiversity:

- habitat loss and fragmentation;
- introduced species;
- over-exploitation of particular species;
- pollution of soil, water and atmosphere;
- global climate change; and
- industrial agriculture and forestry.

Note again that **trade** is part of one of six threatening processes, and it is necessary to compare the impacts of international trade (30 million specimens of reptiles and amphibians annually, see above) with that of the other threatening processes if we are to get some idea of where our biodiversity conservation priorities should lie.

There are about 6,500-7,000 known species of reptiles in the world, yet more than 85% of the trade in skins (**Table 1**), which itself constitutes about 90% of the total reptile trade, is confined to fewer than 20 species.

It is interesting to look at regional differences in the way reptiles and amphibians are exploited. **Table 2** (IUCN, in litt.) indicates the extent of the recent trade in

legally-imported reptile skins into the United States, while **Table 3** (IUCN, in litt.), lists some recent importations of live frogs and turtles into Hong Kong, to be used as food.

TABLE 2. Principal reptile taxa imported annually into the USA, 1984-89	
Tupinambus spp.	1,070,000
Ptyas mucosus	253,000
Homalopsis buccata	236,000
Python reticulatus	134,000
Varanus salvator	132,000
Enhydris bocourti	80,000
Caiman crocodilus	70,000
Acrochordus javanicus	65,000
Lapemis hardwickei	59,000
Naja spp.	17,000
Varanus exanthematicus	25,000
Cerberus rhynchops	21,000
Naja naja	17,000
Python curtus	15,000

At roughly 2 million skins per year, the US is responsible for 10-15% of the international skin trade.

TABLE 3. Live frogs and turtles imported into Hong Kong for food	
1988	2,223 tonnes
1989	2,170 tonnes
1990	2,313 tonnes
1991	1,715 tonnes

While the trade in food species for Hong Kong appears to be fairly stable, there is no indication as to whether the species involved are being harvested on a sustainable basis.

When viewed subjectively, the figures cited above - up to 30-35 million reptiles and amphibians being traded annually - would appear to represent a significant threat to global numbers. Indeed, there is little doubt that declines in some of the most traded species are directly attributable to their utilisation for skins or food.

But if we make even the most conservative estimate of the reptile "kill" resulting from the current rate of clearing of tropical forests at 6 billion per year, then the reptile trade (except for a handful of targeted species) becomes relatively insignificant. This figure is estimated on the basis of published data on equatorial tropical forest loss (Global Biodiversity Strategy, 1992) of 17 million hectares annually, and my **very** conservative estimate of such forests supporting an average of 350 individuals (of reptiles and amphibians) per hectare [compared with 250 individuals/hectare in Australian mallee (Ehmann and Cogger, 1985, see below)].

Ehmann and Cogger (1985) calculated the annual losses (mortality) of reptiles and frogs in Australia from a variety of causes (**Table 4**).

TABLE 4. Some estimates of current annual losses of reptiles in Australia, based on a standing crop of 192,000,000,000 (from Ehmann & Cogger, 1985)	
natural mortality	34,000,000,000
feral cats	> 240,000,000
land clearing	>100,000,000
road kills	5,000,000
research	20,000
keeping	8,000
illegal export trade	2,000

The figures in **Table 4** were estimated by Harald Ehmann and myself in the mid 1980s. They are probably too conservative for the 1990s and to my knowledge they have never been challenged as an over-estimate. The standing crop (that is, the current number of individual reptiles in Australia) is conservatively estimated to be more than 190 billion. We suspect that we could have underestimated this number by an order of magnitude, so that it could be as high as 2 trillion.

While natural annual mortality of reptiles and frogs in Australia is likely to be at least 34 billion, the next most significant mortality on which we have sufficient information to make meaningful estimates is that caused by feral cats, estimated conservatively to be 240 million per annum.

Land clearing gives us a VERY conservative annual mortality of more than 100 million individuals - a figure of 1-2 billion is probably nearer the mark. For example, in the past decade in Queensland, brigalow forest & woodland has been

cleared at the rate of about 500,000 hectares per year. This represents the extirpation of at least 1.25 billion reptiles and amphibians using the same minimum density figure (250/hectare) as for mallee, even though brigalow is considerably richer in diversity than mallee.

And as one works (**Table 4**) through some conservative estimates of mortality, note that research (20,000), keeping of live animals (8,000) and illegal trade (2,000) together represent at most 0.0009% of annual loss of reptiles and frogs from the wild in Australia.

As noted above, a number of agencies have estimated the illegal export trade at a much higher figure than the 2,000 per annum estimated by Ehmann and Cogger (1985). But a survey of dealer's lists in North America and Europe, where most of the major end users of the Australian live reptile trade are located, indicate that numbers traded are modest and prices of individual species are high, a combination suggesting that the Ehmann and Cogger (1985) estimate is reasonable and realistic.

This view is supported by comparisons of trade figures of a neighbouring country (the Solomon Islands) where, despite the fact that the trade is legal, the numbers traded are approximately 10,000 per year (**Table 5**).

TABLE 5: Legal frog and reptile exports from the Solomon Islands, 1989-1991 (IUCN, in litt.)	
Total number of specimens = 33,615 **Major species exported:**	
Corucia zebrata	9,297
Candoia carinata	6,620
Varanus indicus	4,862
Ceratobatrachus guentheri	4,032
Gekko vittatus	2,445

When we prepared the National Action Plan for Australian Reptiles, we looked at the contribution of different threatening processes to the decline of these animals (**Figure 1**). Note that utilisation (including the illegal trade) was not considered a significant threatening process; by far the greatest cause of these declines is land clearance and other inappropriate land management practices.

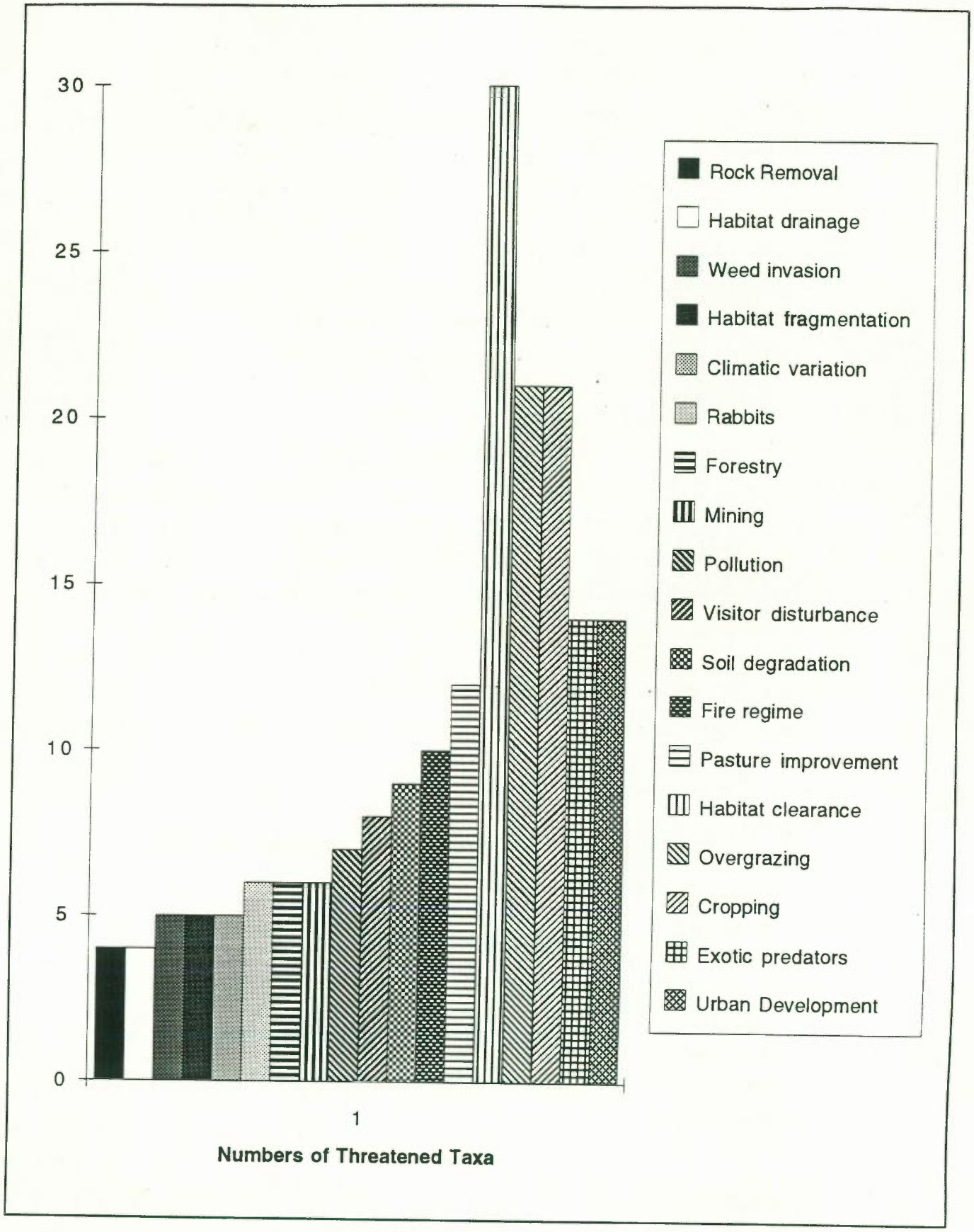


FIGURE 1. The major threatening processes leading to the endangerment of Australian reptiles

Figures indicate the number of threatened taxa affected by each process (e.g. rock removal, 4 taxa threatened; habitat clearance, 30 taxa threatened; urban development, 14 taxa threatened). (Source: Cogger et al., 1993)

Of the major threatening processes identified in **Figure 1**, some can be allowed to operate at potentially sustainable levels, while others can't (**Table 6**). The major threats to our reptiles and frogs are unable to be managed in a sustainable way, whereas minor threats, including consumptive use, are at least capable of sustainable management.

TABLE 6: Causes of loss of Australian herpetofaunal diversity	
Potentially Sustainable	**Non-sustainable**
Natural mortality	Clearing for agriculture & pasture
Forestry	Habitat degradation
Trade	
Exotic predators	

Conclusions

Both globally and nationally there is a continuing decline in most species of reptiles. In Australia, I estimate that between 80 and 90% of species are in decline, many seriously. Several species of Australian frogs are now believed to have become extinct during the past 10-20 years.

I would argue that so far as our wildlife is concerned, there is absolutely no distinction between death from a consumptive use program and death from a farmer clearing mallee habitat to plant cereal crops. The difference is partly one of scale (with the mallee-clearing winning hands down), and partly one of sustainability: consumptive use programs are all potentially sustainable, the mallee clearing can never be sustainable.

We should certainly challenge every wildlife utilisation proposal's claim of sustainability, and we should set appropriate ethical and animal welfare standards for its implementation. But as conservationists we should first and foremost be concerned with minimising, through the allocation of appropriate resources and adoption of appropriate policy instruments, the impacts of the major, unsustainable anthropogenic causes of wildlife mortality and biodiversity loss.

References

Anon. 1992, Global Biodiversity Strategy. World Resources Institute, The World Conservation Union and United Nations Environment Programme. 244 pp.

Ehmann, H.F.W. and Cogger, H.G. 1985, Australia's endangered herpetofauna: a review of criteria and policies. pp. 435-447 in G.C. Grigg, R. Shine and H.F.W. Ehmann (eds) The Biology of Australasian Frogs and Reptiles. Surrey Beatty and Sons with R. Zool. Soc. NSW, Sydney.

Cogger, H.G., Cameron, E.E., Sadlier, R.A. and Eggler, P. 1993, The Action Plan for Australian reptiles. Australian Nature Conservation Agency, Canberra. 254 pp.

COMMERCIAL FARMING OF EMUS

by Scott Cardamatis,
Save Animals from Exploitation (SAFE)

Scott Cardamatis is the Director of the animal welfare lobby group SAFE (Save Animals from Exploitation). For many years he was actively involved in the Duck Rescue Coalition, which finally succeeded in 1995 in banning/severely limiting Duck Hunting NSW.

The Commercial farming of Emus commenced in Western Australia in 1987. By 1990, officers of the NSW Department of Agriculture and NSW National Parks and Wildlife Service (NPWS), after studying the industry in WA, recommended that amendments be made to the NSW National Parks and Wildlife Act to facilitate the farming of Emus in that state. By 1993 Emu Farming was allowed in NSW, and today is permitted in every state. Under all state Acts, Emus are defined as poultry.

In NSW approximately 70 Emu farmers were issued with 121 licenses, to take up to 50 birds per license from the wild. Licenses stipulated that only chicks or eggs were permitted to be taken. All Emus were micro-chipped in an attempt to reduce illegal takes from the wild. Approximately a further 50 license holders imported birds from WA, most of these being young chicks. Regrettably several importers attempted to transport adult birds with dire results. High mortality rates were reported from most shipments whilst many more died later as a result of stress induced myopathy.

In NSW today there are 142 licensed Emu farmers holding approximately 11,000 birds. The NSW Government has not set a limit as to the number of birds that can be held. Nationwide there are approximately 500 Emu farmers holding 75,000 birds.

Australia, surprisingly, does not have the monopoly on the supply of Emu products, Emus are also farmed in New Zealand, France and the United States of America, which by 1994 estimated that they held over 3/4 of a million birds. This outstrips Australian Emus in captivity by 10 to 1. Overseas farmers are also in a much more viable situation than those in Australia due to their access to larger domestic markets and without the considerable burden of necessary bureaucracy associated with trading in a native animal.

The Emu industry across Australia and the world has survived, to date, near exclusively on the sale of livestock.

The Emu industry has grown on one strength, and nothing else, which is farmers buying and selling between themselves. As from Friday of last week the Australian Quarantine Inspection Service (AQUIS) had not received a single application for an Emu Abattoir any place in Eastern Australia. This means it remains illegal to slaughter an Emu in any state outside Western Australia where one Abattoir exists. On top of this , Abattoirs wonít set up for markets and so companies have had to process, market and promote by themselves.

At the first world Emu Farmers Conference, last year, there were only two stalls marketing Emu products, whilst at the Emu Convention in Dallas only one stall sold products.

This now raises the very real question as to how long this industry can continue to grow, let alone survive, where all business is based on livestock sales and there remains only a speculative market for products based on trends.

It is estimated that a slaughtered Emu is worth approximately $300, breaking this down into:-

$150 for skins and legs,
$125 for oil,
$ 25 for meat and feathers.

Yet again these prices remain speculative.

In the February 1994 edition of the Australian Farm Journal, one of the nations leading Emu Farmers, Peter Clark from the Emu Man Pty. Ltd., stated that "The industry is sick and growing on nothing, it is a speculative market with farmers simply buying and selling between themselves. There are no clearly defined markets and unless people are prepared to spend large proportions of money to develop a market, many farmers will kiss Emu farming goodbye because demand for buying and selling between ourselves will die." Mr Clark summed up by saying at this stage the industry is very dangerous to be in.

In 1993 the WA Department of Agriculture stated that it is unlikely that local demand can sustain an industry of even 30 odd Emu farmers; similar figures are being stated by other Agriculture Departments across Australia. If this is the case Australia already has 300 Emu farmers too many.

Over the past five years there has been a virtual 'gold rush' on Emu farming across Australia and certain parts of the world. This rush has not been led by the rural sector but largely by city investors with little knowledge of primary industries. The attraction again has come exclusively from the supposed high returns based entirely on live stock sales, some companies, when attracting investors, fail to even mention the fact that no markets exist - let alone an abattoir in Eastern Australia.

Fearing the 'gold rush' is about to end, many Emu farmers have amalgamated in an attempt to market Emu products - both here and abroad. Emu products are being marketed in three forms, exotic leather, oil and meat. Whilst Emu meat is being promoted in over 1,000 restaurants across Australia, demand has remained much lower than expected. According to the WA Department of Agriculture, the Emu industry faces a particular problem in meat marketing. Emus are seasonal breeders and the industry has identified 45-55 weeks of age as the optimum age for slaughter. This means that fresh meat will only be available for six months of the year. On top of this the cost for air freight is approximately $7 per kilo, yet sea freight takes over 50 days. This is not to mention the availability of locally grown produce which will be cheaper and fresher.

Exotic Emu leather that was highly sought after in the 1980s, because of it's 'crocodile look', has, in the 1990s been shunned along with most other forms of exotic leather and fur. This trend against animals in fashion does not appear to be changing, so unless Emu leather itself can change, then only marginal sales can be anticipated and preferably from local markets.

Emu oil, which is being promoted as the wonder cure of the 1990s, for all aches and pains, relies near entirely on testimonials. Like an endless 'Demtel Ad', Emu oil producers fill their promotional brochures with a litany of countless claims that Emu oil saved them from another Winter of agony; not surprisingly no scientific proof of this claim is attached to the bottles which are most commonly found in souvenir or medical shops.

Combining all these factors, the long term outcome for the Emu industry is looking very grim.

This now gives rise to the most significant danger that poses a very real threat to the entire Emu population. By the end of this year there will be approximately 10,000 WA Emus scattered across Queensland and NSW with 88,000 in Victoria. The Western Australian Emu has evolved separately over millions of years from

their eastern counterparts. In WA their diet is quite different as is their tolerance to diseases and naturally occurring poisons such as Fluro Acetate (known in its concentrated form as 1080).

Genetically the WA Emu is an entirely different bird to the Eastern Australian Emu - they may look the same but they are each specialised for their particular environment. This evolutionary process would have occurred over millions of years but soon this may change, and in some parts it may have already. A lot of people in this room today would have raised an orphaned or injured native bird or animal. Most of us know that the golden rule is to release the animal back to where it came from when it is able to be returned to the wild. Why? Not because it can rejoin its family but to maintain the gene pool. In NSW the law states that this must be within 200km.

The biggest threat to the Emu does not come from illegal operators, some of whom have already been identified, but from WA Emus escaping or being released then breeding with the wild Eastern Emus.

It stands to reason that as the Emu begins to lose value so will the ability to maintain them. If the Emu market completely crashes what will happen to the excess stock? Logic and past cases show that their welfare will undoubtedly be compromised as will their ability to be held in suitable enclosures.

What is now needed in every state is an immediate freeze on the issuing of further licenses. Existing licenses should also be given a crown as to the number of birds which can be held.

A watchdog committee in each state should be set up to oversee operators and ensure that stock are not being released into the wild when farmers go bust. These committees should not act as marketing bodies for Emu products as have some existing wildlife management committees. They should be comprised of conservation agencies, government bodies including the NPWS and the Department of Agriculture as well as Emu producers, in order to protect wild birds.

Finally the Emu, along with the Kangaroo was chosen on our coat of arms because neither can walk backwards. In the short five or so years of the Emu industry we have treated our most majestic of all birds with such contempt that we now feel they are only worthy of having the same respect and protection by law as that of a battery chicken.

Update - July 1997

As predicted, the value of the Emu began to fall dramatically at the start of 1997, with many farmers undertaking "flock reduction" programmes across the world as the cost of feeding these birds overtook the primary return for a slaughtered Emu and its associated products.

In Australia, the perils of entering the industry have become more widely known through numerous media reports. However, the industry has remained successful in continually enticing many city investors into this dubious industry.

Emu farmers in the United States have also come under world attention recently for their deflocking methods, including one "rancher" in Dallas, Texas who recently clubbed to death 22 Emus. Whilst encountering difficulties in attempting to move the birds from their penned enclosure, the rancher became angry and took to the birds with a baseball bat. Police were called by a neighbour and found a pile of dead Emus lying inside a trailer. The man was later quoted as saying that he was "frustrated by financial losses in breeding these once valuable flightless birds".

ECOLOGICAL IMPLICATIONS OF THE BUSH TUCKER RESTAURANT INDUSTRY

by Dr David R. Murray, F.R.H.S., F.L.S.,
School of Horticulture, Faculty of Agriculture and Horticulture,
University of Western Sydney, Hawkesbury Campus

David Murray gained 1st Class Honours in Botany from the University of Sydney. As well as a great interest in all aspects of seed development, he is also involved in bush rehabilitation and the conservation of indigenous fauna and flora. He has published widely and is a member of a number of plant conservation associations. He has a long-standing interest in food quality issues, has carried out an independent review on irradiation of food and is the author of the book, 'Biology of Food Irradiation'. David currently teaches Environmental Horticulture at the University of Western Sydney, Hawkesbury. He is also a Executive member of the Nature Conservation Council of NSW.

Summary

The major indigenous foods offered by restaurants and their supply companies are identified. Three categories in particular are discussed: plant foods, large vertebrates, and witjuti grubs. The continued collection of some native fruits for human consumption would deprive some birds and animals of their obligate food sources, and restrict seed dispersal. Nor should leaves continue to be taken from rare rainforest trees such as *Backhousia anisata* (native aniseed). Witjuti grubs pose a particular problem, as even experienced entomologists cannot distinguish rare from common species at a glance. However, if all indigenous food consumption could be matched with deliberate farming, plantation and home garden production, this would remove adverse impacts on wild populations of the organisms in question. Indigenous food consumption might then be judged to be ecologically sustainable. Some modern myths concerning the alleged nutritional superiority of *Acacia* seeds are dispelled. Consumers need reassurance from further research that indigenous plant foods are safe to eat, with no adverse immediate or long-term health impacts. As conservationists we should support initiatives for sustainable food production consistent with rehabilitation of degraded habitats and conservation of the total indigenous fauna. Trees and woody shrubs, including those deliberately planted for oil, timber and food, are collectively the only agent in the biosphere capable of curbing the continued

increase in the mean atmospheric concentration of CO_2 . Balancing the carbon dioxide equation is the bottom line for ecologically sustainable development.

Introduction

Australians of European origin have expressed an increasing interest in Aboriginal bush foods over the past century. Much of this interest is authentic, arising from genuine curiosity and willingness to learn. Many new books on the subject have been published. Part of this interest, however, was initially exploitative. We need to be aware that in the early 1980s the modern bush foods restaurant industry was launched with misinformation about the nutritional value and safety of some bushfoods, typical of advertising campaigns promoting many other consumer products.

The bush tucker restaurant industry has overcome this inauspicious start, and looks set to undertake unprecedented growth. In the context of placing everything we do on a sustainable basis, we should ask whether consumption of bush foods poses a threat to the survival of any indigenous species, or to the biodiversity of any habitat. Is restaurant-led bush food consumption being channelled, through horticulture and farming, to a sustainable basis? Only if such consumption is being matched with deliberate production, removing all adverse impact on wild populations of the organisms in question, might it then be judged to be ecologically sustainable.

As Tim Low (1989) reminds us, we are already in a situation where many former indigenous major food species have been wiped out, or have become restricted, rare, and endangered. This Century alone an estimated 18 species of mammal have become extinct. Such estimates may be imprecise, as some species have reappeared after dropping from sight for more than 100 years (Calaby 1977). Nevertheless, European introductions have been "an almost unrelieved disaster for the native fauna" (Calaby, 1977, p.65). Birds have disappeared also. As well as the night parrot and paradise parrot, "the dwarf emus of Kangaroo and King Islands, miniature species just over a metre high, were completely exterminated for their meat" (Low, 1989, p.213).

Our total fauna is facing a precarious future through continued and massive destruction of natural habitat and the depredations of introduced species, including disease organisms (Denny 1992, Glanznig 1995). So what about the native species of plants and animals that have come onto the menus of specialist

restaurants over the past 10 years or so? Are any of these being endangered because of the activities of overzealous collectors or hunters?

What's On the Menu?

Bush food ingredients are supplied to restaurants by companies that co-ordinate their gathering, harvesting and processing. The two best known companies are Bush Tucker Supplies Australia, founded by Victor Cherikoff, and Australian Native Produce Industries, which supplies the Red Ochre Grill chain, established in Cairns, Sydney and Adelaide.

Bush Tucker Supplies Australia has a network of about 2,000 individual suppliers. Australian Native Produce Industries has been in the news recently over plans to market camel meat. The currently available range of meats already includes emu, kangaroo, crocodile, rabbit, and seafoods. Among the better known bush tucker restaurants or retail outlets are Edna's Table, Rowntrees and Riberries. Robins Bush Foods was established by Ian and Juleigh Robins in Melbourne in 1993 (Robins 1996). The Red Ochre Grill menu includes the following:

Dinners (Starter or Main Course)

- Grilled focaccia with pesto and bush tomato chilli jam
- Australian antipasto plate - emu pate, lemon aspen gravalax, smoked kangaroo with pepperleaf mustard, lemon myrtle pickled octopus, mediterranean char-grilled vegetables with bush tomato skordallia and bruschetta
- Salt and pepperleaf prawns with pickled Kakadu plums and lemon aspen sambal
- Sweet potato gnocchi - eucalyptus smoked salmon, baby capers and olives - dill buerre blanc
- Warrigal spinach spaghetti tossed with roast garlic, roma tomatoes, basil and parmesan chips
- Twice cooked pork shank, native spiced Davidson plum sauce and crisp rice pancakes
- Moreton Bay bug and sea parsley terrine with tomato, lemon myrtle coulis, rocket and mandarin salad
- Pan roast duck breast and confit leg - yam fritters and quandong chilli glaze

From the Mallee Char Grill:

- Emu steak with steamed emu bun - native aniseed butter sauce
- Kangaroo fillet with couscous and harissa spiced riberry juice

- Pepperleaf blackened chicken breast with smoked tomato salsa and three beans
- Rabbit fillets with pollenta and pepperberry cream sauce
- Today's fresh fish

Side Orders:

- Spiced fries
- Warrigal spinach and yam gratin
- Seasonal vegetables with lemon myrtle olive oil
- Tossed mesclun salad with lemon aspen and macadamia dressing
- Red Ochre salad.

Desserts:

- Baked orange and wild lime tart with guava coulis
- Wattle seed and nougat chocolate torte with rich chocolate and native peppermint ice-cream and riberry coulis
- Wild sorbet, ice-cream and tropical fruit plate with tuille basket
- Black sapotte and macadamia pudding - native aniseed anglaise
- Lemon aspen brulee with almond toast, strawberry and custard apple compote.

Other items likely to be encountered at various restaurants include muntari, small fruits that taste like dried apples, Burdekin plum, and Illawarra plum or 'plum pine'. Various wattle seed products are on offer, such as pancakes, shortbread, ice-cream and ersatz coffee. Other types of seeds are utilized, and at Rowntrees the Australian Restaurant one of the soups is witjuti grubs with bunya nuts. This is also available as a 'gourmet' canned product from Bush Tucker Supplies Australia.

Where Does it Come From?

1. Plants

Native "tomatoes" are not tomatoes *(Lycopersicon)*, but fruits of species belonging to the genus *Solanum*, such as *Solanum aviculare, S. centrale,* and *S. stelligerum.* Other common names describe them as 'apples', 'raisins' or 'currants'. The fruits are generally dried before eating, although Cherikoff and Isaacs (1989, p.95) illustrate a recipe involving both cooked and fresh fruits of *Solanum nigrum.*

For their lemon flavour, leaves are obtained from lemon aspen trees *(Achronychia acidula)* and lemon myrtle trees *(Backhousia citriodora).* Pepperleaf or Mountain pepper is *Tasmannia lanceolata;* both leaves and fruits are 'peppery'. Warrigal

spinach *(Tetragonia tetragonioides)*, also known as New Zealand spinach, has leaves that serve as a green vegetable. This plant was utilized by members of Captain James Cook's expedition here in 1770. Sea parsley *(Apium prostratum)*, a dune-cover plant, is also a green vegetable. A narrow-leafed form of this plant is called sea celery.

A relation of the lemon myrtle tree has leaves which are cut to provide aniseed flavour, both as a herb and with tea. This is *Backhousia anisata*, a much scarcer species found in rainforests, and classified by Floyd (1990) as rare, with a restricted distribution (less than 100 km). To the best of my knowledge no significant cultivation of this plant has so far taken place, yet both of the major supply companies mentioned currently stock native aniseed leaves.

The Davidson plum is *Davidsonia pruriens*. With added sugar, it is highly regarded because of its tangy flavour (Cribb and Cribb 1976, Low 1989). However, it is rare to the point of being endangered (Floyd 1990), and confined naturally to a small area of tropical rainforest in Queensland. Home garden planting has been recommended by several authors. A closely related species has been found in the north of NSW near Byron Bay. The Kakadu or green plum *(Terminalia ferdinandiana)* is allegedly very rich in vitamin C, but the analysis by Brand and colleagues (1983) appears to be an over-estimate by at least a factor of 10. According to Dr Margaret Dwyer, formerly of the Biochemistry Department of the University of Sydney, there is a very wide variation among individual fruits, with some having practically no vitamin C content at all.

The quandong or native peach, *Santalum acuminatum*, is a small hemiparasitic tree, which becomes attached to a host plant such as an acacia via its root system. The fruit is normally eaten by emus, who pass the stones containing the seed. The kernels too can be liberated by cracking the stones, and eaten, but they are not universally praised. "Hungry camels have taken their toll on quandong trees" (Low, 1989, p.214), so the removal of camels for meat might have a beneficial effect on quandong recovery.

The riberry is a particular kind of lilly pilly fruit - from *Syzygium luehmannii*. The original lilly pilly, *Acmena smithii*, is fairly insipid by comparison. Fruits of other species of *Syzygium* are also eaten, and all improve when sweetened as jam. Muntari are the fruits of *Kunzea pomifera* (also Myrtaceae), a dune-cover plant from the coastline from Yorke Peninsula in South Australia to the Glenelg River.

The small fruits of several rainforest species of *Microcitrus* provide 'wild limes'. The most common are *M. australis* and *M. australasica.* The Burdekin plum *(Pleiogynium timorense)*, a tropical species, produces large purple fruits that have to be kept several days after picking to become soft and palatable. Low (1989) notes that Joseph Banks made this observation in 1770. The fruits make an excellent, tangy jam. The Illawarra plum is not an Angiosperm but a Gymnosperm - *Podocarpus elatus.* As most southern coastal rainforest has been cleared, there are very few of these trees left, in remnant pockets either on private property (e.g. dairy farms) or in National Parks.

Bunya nuts are the seeds of another Gymnosperm - *Araucaria bidwillii.* These are formed in massive female cones at intervals of 3 years. Unlike cultivated macadamias, these must be cooked. The seeds of various kurrajongs (*Brachychiton* species) are also safe to eat roasted, and highly nutritious. The protein content of *Brachychiton* seeds, 17%, is double that of a typical *Acacia* seed (Murray 1994b). *Brachychiton* seeds were often conveniently recovered from crow droppings before being processed (Morley and Toelken 1983) - this ensures that irritating hairs in the outermost seedcoat are avoided.

Macadamia integrifolia (Proteaceae) represents a genuine success story - even if cultivation did occur first in Hawaii, about 70 years before major interest was shown here. The nut is delicious, and has one of the highest recorded oil contents. Horticultural production has increased steadily, and Australians have invented 'maca crackers' and machinery to streamline harvesting. Researchers at Maroochy have shown that there is still potential for considerable increase in yield per tree (HRDC Report 1993/1994).

More than 18 species of *Acacia* may serve as a source of wattle seeds that are eaten in the arid parts of Australia. Species such as mulga *(A. aneura), A. victoriae, A. murrayana* and *A. kempeana* are prominent seed sources (for illustrations, see Simmons 1981). However, tough, woody seedcoats account for about 40% of the seed mass (Table 1). These seedcoats initially protect the embryo during dispersal by birds or ants, or scattering by the elements, and permit the embryos inside the seeds to remain viable for at least 100 years (see Murray 1994a). Their impermeability to water can be overcome by abrasion, or by thermal shock, such as that caused by a fire passing over buried seeds.

Table 1. Distribution of Seed Mass Between Seedcoats and Embryo for Several Species of Australian *Acacia*		
Species	Mean seed mass (mg)	Seedcoat % of seed mass
A. iteaphylla	44.6	38.1
A. longifolia, sample 1	25.2	43.1
A. longifolia, sample 2	24.6	33.7
A. saligna	20.1	40.1
A. sophorae, sample 1	41.9	37.0
A. sophorae, sample 3	35.1	37.1
Data from W. J. Ashcroft (1977) and D. R. Murray et al. (1978)		

Ground seeds are never free of this seedcoat material, even though some is removed by 'yandying', and it is hard work processing the seeds. Aboriginal children make a paste from the ground seeds and eat it without cooking; adults generally prepare a damper (Isaacs 1987).

Sometimes available are seeds of the red boppel nut, *Hicksbeachia pinnatifolia*, seeds of the 'peanut tree', *Sterculia quadrifida*, and native rosella - the unopened flower buds of *Hibiscus heterophyllus*. This plant interested Governor King as a possible fibre source - still an unrealised potential. Among native figs (*Ficus* species), 'fruits' of the sandpaper fig, *Ficus coronata*, are said to be the best (Cribb and Cribb 1976), and fruits of *F. platypoda* were particularly important to Aborigines in the north (Morley and Toelken 1983). The 'fruit' is technically a 'syconium', and develops from an inverted receptacle surrounding both male and female flowers on the inside.

2. Large Vertebrate Animals

Kangaroo meat comes from some of the many thousands of kangaroos that are shot annually as 'pests'. The present situation is a shambles from all perspectives, and one that must be improved urgently. How are we to tell what the species is once the carcass has been skinned and dismembered? Selection against large individuals is not good for the gene-pool of the species - can we really trust the suppliers to spare enough of the largest red kangaroos *(Macropus rufus)*? How good is the shooter at distinguishing species under the rushed and ill-lit circumstances of an evening's spot-lighting, especially when the female 'red' kangaroo is actually a bluish-grey?

John Gould assessed our fauna as potentially endangered in the middle of the 19th Century, writing as follows: *"Short-sighted indeed are the Anglo-Australians, or they would long ere this have made laws for the preservation of their highly singular. and in many instances noble, indigenous animals; and doubly short-sighted are they for wishing to introduce into Australia the productions of other climes, whose forms and nature are not adapted to that country. Let me urge them to bestir themselves, ere it be too late, to establish laws for the preservation of the large Kangaroos, the Emeu, and other conspicuous indigenous animals: without some such protection, the remnant that is left will soon disappear, to be followed by unavailing regret for the apathy with which they had been previously regarded."* (Gould, 1863; p. 16 of 1973 edition).

John Gould was one of the first to point out that emus and kangaroos are less damaging to the countryside than the sheep, cattle and horses that otherwise displace them. So we have known about this basic ecology for a long time (Gould 1863, Sherrie 1919). In recent years it has often been suggested that we should establish kangaroo and emu farms on rehabilitated farmland, and from them produce eggs, feathers, leather, oil and meat (Lunney and Grigg 1988, Schulz 1990). Leather of excellent quality and for different purposes can be prepared from both. At present most kangaroo carcasses are wasted, the animals having been shot for their skins alone. The farmers on whose properties the shooting occurs receive next to nothing except the removal of animals that they see as competitors for food and water with their domestic flocks and herds.

Emu oil is reputedly effective as a deep rub for the treatment of arthritis, and its local production would save a massive pharmaceutical bill for presently imported medications (Australia All Over, ABC Radio, 9th July 1995). Emu oil would be a valuable byproduct of emu meat production, but the killing of emus for processing is so far permitted only in Western Australia. Indeed warnings have been issued about some schemes attempting to attract investment in other states (The Investigators, ABC TV, 25th July 1995). Emu farmers in NSW have formed the Emu Producers' Association (telephone 063 750245), and for their efforts to be financially viable, they need legislation that would permit slaughtering in NSW.

In 1990, legislation permitting human consumption of kangaroo meat operated only in the Northern Territory and South Australia. Corresponding legislation in NSW dates only from late 1992. Kangaroo meat is a lean product, low in saturated fats. The farming of emus and kangaroos would clearly be preferable to sheep or beef production, which is extremely damaging to pasture and native vegetation,

creating intractable problems of weed infestation, soil erosion, water pollution, and the harbouring of feral introduced animals. These problems are exacerbated by drought and overstocking.

Advocates of farming our large native species have a sound case when it comes to considering the damage caused by conventional farming of introduced cloven-hoofed animals. Applied ecologists like Grahame Webb in the Northern Territory consider that sheep cause "outrageous environmental damage" (Schulz, 1990, p.44). Webb further argues that farming of native animals is in itself "one of the most powerful solutions to their conservation problems", having demonstrated this with both saltwater and freshwater crocodiles (Schulz, 1990, p.45). Gordon Grigg's 'sheep replacement therapy' (see these proceedings) has a great deal to commend it.

The overproduction of wool in this country has become an economic albatross and a national disgrace. And it is not only sheep production which is out of control. With Government encouragement, Queensland beef producers have built their herds to 26,000 for a non-existent Japanese export market (Meade 1995). As it costs $5 per day to grain feed each animal, and they are not suitable for the domestic market because of the meat's excessive fat content, most will have to be shot unless spring rains come. If the same effort had been put into developing an export market for kangaroo and emu meat, Australian producers could not have been deprived of sales so easily by American beef producers.

3. Insects

As a human food source, witjuti (witchetty) grubs are far more imperilled by collection than emus or the most numerous species of kangaroo. The potential for loss of biodiversity is far greater than might first appear. The larvae that are sought after as witjuti grubs belong mainly to the Families Buprestidae (Jewel Beetles) and Cerambicidae (Longicorn Beetles) within the Order Coleoptera, or to the Families Hepialidae (Swift Moths) and Cossidae (Goat Moths) within the Order Lepidoptera.

These insects occur in a wide suite of habitats ranging from rainforest and mangrove flats to arid zone. As adults, some perform an essential role in pollination, and all are involved in the food chains of their natural predators. For many, most of their original habitat has already been destroyed, an observation made repeatedly by Trevor Hawkeswood (1987). Moreover, the jewel beetles once sustained the excessive attention of collectors, who literally incorporated the adults into items of jewellery.

Most of the witjuti grubs eaten by humans are found within the stems and roots of woody plants, which they enter and eat over considerable periods, often up to 3 years. One of the cossids is responsible for weakening and releasing parts of the tumbleweed, *Salsola australis*. This plant is really an introduced weed in the U.S.A., and was named from an Australian specimen by Robert Brown in 1810 (Kruszelnicki 1993). The largest cossids are members of the genus *Xyleutes*, and the giant wood moth, *X. boisduvali*, has a wingspan of roughly 14 inches. Harvesting these larvae can involve destruction of whole eucalypt saplings, although larger trees are simply explored with hooks through holes indicated by frass or gum exudate.

In Central Australia the Pitjantjatjara people can detect the presence of cossid witjuti grubs in enlarging roots of *Acacia kempeana* by the stress cracks on the soil surface. The swollen roots are cut off, and the larvae, often 10 cm long, are excavated from the wood. Acacia trees are not usually destroyed by this procedure, and small shrubs may actually be preserved by having their few grubs removed. Nor is the normal demand for witjuti grubs likely to imperil the insect species - such highly nutritious and soft food is customarily eaten by the women and children who carry out the harvesting (Isaacs 1987).

Uncooked, witjuti grubs are said to taste like butter or cream, with 'nutty' overtones contributed by their own food source. Cooked, they take on aspects similar to bacon rind and fried egg. Every writer is enthusiastic about their palatability. Thus an escalation in consumption on the part of tourists in some locations seems very likely. Herein lies a considerable danger. Very few people can distinguish one species from another. Even entomologists need the aid of a hand lens or dissecting microscope to study detail. Rare species cannot be assured of protection when no one can tell at a glance which is a rare specimen and which is a plentiful type. Furthermore, once frozen, pureed and canned with bunya nuts as a 'gourmet' soup, as described on p.107 of Cherikoff and Isaacs (1989), not even an entomologist could distinguish the species. We have only the word of the supplier that harvesting for such purposes is 'sustainable'. Clearly, indiscriminate suppliers could eliminate larvae from crucial tracts of their remaining habitat, and no one outside the bushfood supply network would know for some time.

Is It Good For You? - Demythologizing the Hype

1. A "unique Australian cuisine"?

How can a few recently contrived recipes that incorporate a handful of Australian native ingredients represent a "unique Australian cuisine"? (Cherikoff and Isaacs, 1989, dustjacket). Just a trifle pretentious - and how exquisitely undermined by inclusion of the French word 'cuisine' - reflecting our requisite cultural cringe. I personally reject the imputation that only the French are capable of cooking food worth eating. The down to earth approach of Jack and Reg Absolom (1982) presents an appropriate contrast.

So far as bush foods are concerned, we need to identify the substantive issues of quality:

- Will it harm you if you eat it?
- Does it taste good?
- Is it nutritious food?

From the consumer's perspective, satisfactory answers to these questions come ahead of:

- Will it help or harm the environment if you eat it?

2. Toxins and Nutrition

From a nutritional standpoint, the quality of kangaroo, wallaby, crocodile and emu protein will be much the same as for muscle meats from domestic animals and rabbits. This is no longer in contention, although it once was (Lunney and Grigg 1988). But where plant foods are concerned, we should not anticipate toxicological or nutritional miracles. In evolutionary terms, we would not expect "many bushfoods" to be "richer sources of nutrients than similar cultivated plants" (Anonymous, 1984, p.3). Compared to food plants that have been domesticated and selected for quality attributes over thousands of generations (Murray 1984a, 1995c), Australian plants are almost entirely still untouched. *Macadamia integrifolia* is an exception, and its domestication is still in progress. Selection pressures on the indigenous flora have been exerted by natural factors, especially by interaction with co-evolving vectors involved in pollen transfer and seed dispersal - Australian insects, birds, reptiles and mammals (see Murray 1986).

From the human food perspective, there is scope for substantial improvement. Native fruits are too often a punishment rather than a pleasure. They are usually tart, lacking sweetness. They often lack flavour - that which there is may be

satisfactory, but dilute - a higher concentration of flavour constituents is desirable. Some fruits are fibrous and stringy, with low pulp to seed ratio. One of the best candidates has not even made it onto the menu yet - this is the native passionfruit *Passiflora cinnabarina,* from NSW and Victoria.

Toxins abound - in the sporocarps of nardoo *(Marsilea drummondi)* and the seeds of *Macrozamia,* as prime examples. Warnings about toxic alkaloids (including solanine) in *Solanum* fruits date back at least to Guilfoyle (1884). It is an article of faith that alkaloid concentrations decline as *Solanum* fruits ripen, but to the best of my knowledge this has not been established by analysis. Furthermore, cooking 'green' potato tubers that contain solanine does not destroy this alkaloid.

Those who advocated consumption of native peas *(Swainsona* species) in the 1980s neglected the well known occurrence of swainsonine in this genus (e.g. Julian Cribb in 'The Australian'). Swainsonine is an alkaloid that inhibits a certain type of hydrolytic enzyme, with fatal consequences in mammals (see McBarron 1976, McGee and Murray 1986). Darling peas are no longer on the menu. However, the toxicity or otherwise of individual soluble 'non-protein' amino compounds in Australian Acacia seeds has not yet been established (see Bradke and Murray 1989). Brand and Maggiore (1992, p.54) concede "little is known about other factors which may compromise long term safety".

Compounds that release cyanide on hydrolysis (cyanogenic glycosides) were eliminated from cultivated *Macadamia integrifolia* seeds by appropriate selection of non-toxic lines (Bailey 1909, Francis 1929). But macadamia nuts collected from the wrong wild species are still laden with cyanide-producing toxins, and will trap the unwary, just as apricot kernels did for some seeking a cancer cure in the recent past. Contrary to an opinion that the kernel of the red boppel nut *(Hicksbeachia pinnatifolia)* ".... is quite safe to eat even unroasted ...." (Cherikoff and Isaacs, 1989, p.157), both this species and the 'tangy' Davidson plum are listed as cyanogenic by Cameron (1994).

There is clearly a need for research to determine the extent to which toxins are a problem. Toxins should be thoroughly documented by modern analytical procedures, as they include carcinogens (McBarron 1976, Bell 1984). Bush tucker restaurant patrons need to be reassured that they are not consuming foods that will have immediate or long-term impacts on their health.

Consumers have good cause to be wary of advertisements that appeal to scientific authority with the line 'University controlled tests prove that X is better than Y'.

Here is a classic example. In 1984, three members of the University of Sydney Human Nutrition Unit in the Department of Biochemistry (J. Brand, V. Cherikoff and S. Truswell) claimed that the seeds of nine species of Acacia eaten by Aborigines were "strikingly nutrient rich with higher energy, protein and fat content than crops such as wheat and rice and even higher than some meats"(Anonymous, 1984, p.3). Given the very high proportion of *Acacia* seeds occupied by inert or negatively-interacting materials in the seedcoats (Table 1), and their overestimation of protein content (discussed below), this statement is optimistic to say the least.

With my colleagues at the University of Melbourne, I had earlier published the first detailed studies of *Acacia* seed proteins. We had shown for two species that the extractable protein content was only 12% to 13% of seed dry matter content (Murray, Ashcroft, Seppelt and Lennox 1978, Murray 1984b). We found somewhat lower values for *A. saligna* and *A. iteaphylla* (Ashcroft 1977, Ashcroft and Murray 1979). These pioneering studies were subsequently extended to include most of the 'edible' species in question. The extractable seed protein contents, measured with a biuret reagent, were found to range approximately between 5% and 14% (**Table 2**).

Table 2. Extractable Protein Content of *Acacia* Seeds Considered to be Edible in Australia, Plus Two Island Species

Species	Mean seed mass (mg)	Protein content:	
		mg per seed	% of seed mass
A. adsurgens	7.9	0.68	8.61
A. aneura	18.2	1.97	10.82
A. bivenosa (= *A. ligulata*)	34.9	2.53	7.24
A. cowleana	11.5	1.20	10.42
A. coriacea	70.1	4.82	6.88
A. holosericea	11.4	1.06	9.32
A. murrayana	29.4	2.01	6.84
A. sophorae	37.7	4.70	12.47
A. tetragonophylla	30.7	4.06	13.23
A. victoriae	26.6	1.30	4.89
A. confusa (from Taiwan)	26.3	2.56	9.76
A. koa (from Hawaii)	78.7	9.40	11.95

Data from D. R. Murray and C. M. McGee (1986) and D. R. Murray (1992)

Most of the 'edible' species come in well under 10%, substantially below the Sydney group's estimates of 17% to 27% (Brand, Cherikoff and Truswell 1985). These are

overestimates because they are not based on a determination of protein at all, but on a value for total seed nitrogen (N) multiplied by an arbitrary factor, 6.25, to reflect the mass ratio of N to other atoms comprising protein. But the assumption that all of the N in the seeds belongs to protein, and none to nucleic acids, non-protein amino acids, or even nitrogenous bases found in some lipids, is unwarranted and unscientific. Professional biochemists in the post Watson-Crick era would certainly know this. Ironically, the first person to establish that non-protein amino compounds are abundant in Acacia seeds also worked at the University of Sydney (Petrie 1908).

For this group to totally ignore all previous scientific observations on Acacia seeds in order to proclaim their spurious nutritional superiority constitutes a major breach of scientific ethics. The opportunity for revision existed between June and September 1984 following my telephone conversation with Mr Cherikoff on 27th June 1984. This was immediately after an item in 'The Australian', but well before the article in the September issue of the University Gazette (Anonymous 1984). However, this window of opportunity was left firmly closed. The well-rehearsed hype was allowed to contaminate the scientific literature (Brand, Cherikoff and Truswell 1985). Instead of being retracted, this drivel has been deliberately perpetuated with claims of an average value of 22.8% protein content for 58 seed samples from 26 species (Brand and Maggiore 1992).

It is important to recognize that the two exotic species listed in **Table 2** are definitely <u>not</u> edible - their seeds contain powerful neurotoxins that are absent from indigenous Australian species. They are listed to demonstrate that their seed protein contents fall within the range now established for close to 30 Australian species.

Not only do *Acacia* seeds contain much less protein per seed than seeds of cultivated legumes, the nutritional quality of that protein is poor compared to long domesticated legumes such as chick pea and pea (Murray and Roxburgh 1984, Murray 1984a,b). Cooking is essential to denature the proteins present that would otherwise inhibit our proteolytic digestive enzymes (Weder and Murray 1981), however, cooking cannot be relied upon to deactivate phenolics with similar effects present in the seedcoats. It is possible that Aborigines would not have resorted to eating *Acacia* seed inland if there had been better food always available. This was the case in Victoria, where mature *Acacia* seeds were not eaten (Zola and Gott 1992).

Towards Sustainable Consumption

The gathering of leaves from trees or shrubs can easily be carried out so that lasting damage is not inflicted on the source plants, with the potential for regeneration left unimpaired. However, the collection of native aniseed leaves from rare *Backhousia anisata* trees in rainforest habitat is indefensible, both from an economic standpoint, and with regard to the growth rates and health of these trees. Aniseed flavour is far more cheaply available from the vigorous annual herbs fennel *(Foeniculum vulgare)* and aniseed (anise, *Pimpinella anisum).* Considering that these plants grow as readily as weeds, the expenditure on labour and transport for the native version is grossly inefficient, as well as being undesirable because it retards the growth of rare trees.

The gathering of fruits involves their removal as food sources for local fauna, and the inevitable withdrawal of seeds that would otherwise be dispersed by natural vectors and contribute to the next generation of plants. Such interference in the seasonal abundance of fruits therefore has a dual impact - on the bird or animal seeking food, and on the plant's reproductive potential. For these reasons, harvesting bush foods in National Parks, native forests, water catchment areas, suburban parks and roadside verges that belong to wildlife corridors, and other sensitive areas such as foreshores, should normally be prohibited.

Collection of fruits and seeds might be permitted exceptionally, where it can be demonstrated that a modest removal is not detrimental to native fauna or to plant reproduction. A permit system similar to that presently operated by the National Parks and Wildlife Service in NSW for protecting native plants would be adequate, provided it were policed effectively.

Growing native food plants in the home garden is worthwhile for some species, such as those listed in **Table 3**. Seeds of *Podocarpus elatus* (the Illawarra plum or plum pine) have been offered through the Society for Growing Australian Plants and are currently being offered by the Seed Savers' Network (1995, p.17). In the past, seeds of quandong, Davidson plum, kurrajongs and other species have been available from these sources. Some of these plants are included in present planting initiatives of Landcare and Greening Australia.

Table 3. Tree Species Yielding Bush Foods and Capable of Being Grown in the Home Garden		
Species	Propagation	Reference(s)
Acmena smithii (lilly pilly)	seeds	Low (1989)
Acronychia acidula (aspen)	seeds	
Backhousia citriodora	seeds	Oakman (1984)
	cuttings	Macoboy (1994)
Brachychiton species	seeds	Murray (1994b)
Davidsonia pruriens	seeds	Cherikoff and Isaacs (1989), Low (1989)
Hicksbeachia pinnatifolia	seeds	Low (1989)
Podocarpus elatus	seeds	Cherikoff and Isaacs (1989)
Sterculia quadrifida	seeds	Oakman (1984)
Syzygium species	seeds	Oakman (1984), Low (1989)

The C.S.I.R.O. Division of Horticulture has formed a collection of quandongs, representing the observed variability in fruit types. One of the most suitable has been selected and is available from nurseries in Mildura. The same organisation is conducting a breeding program for wild limes, and some new hybrids of *Microcitrus australasica* have been produced.

According to Low (1989), the muntari is being locally cultivated as a ground-cover in South Australia, and *Syzygium luehmannii* (the riberry) is extremely common in cultivation in Queensland and NSW. In contrast, the magenta lilly pilly *(Syzygium paniculatum)* is now "an uncommon tree restricted to seashore rainforests in New South Wales" (Low, 1989, p.62) and has been classified as endangered by Floyd (1990). In cases like this, a replanting campaign would be beneficial.

Native spinach has been available for planting in home gardens for some years. It has been listed by members of the Seed Savers' Network, and is currently available from a number of the smaller seed companies, including: Eden Seeds (MS 316, Gympie, QLD, 4570), Green Patch Seeds (PO Box 1285, Taree, NSW, 2430) and Phoenix Seeds (PO Box 207, Snug, Tasmania, 7054).

For many indigenous plants growth is slow, and the grower must be patient. However, the goal of home production for some of the bush foods suggested by Cherikoff and Isaacs (1989) is totally impractical. My solitary wombat vine

(Eustrephus latifolius) produces three small orange fruits per annum, that take several months to ripen fully. I have occasionaly planted the few seeds produced in damp leaf litter, but to no avail. I still have only one vine. There is a lot yet to discover about propagation of Australian native plants. This is the kind of research that the Society for Growing Australian Plants would be interested in supporting through the Australian Flora Foundation (GPO Box 250, Sydney, 2001).

Planting on a larger scale can be described for convenience as 'plantation', whether the planting is enclosed by fencing or not. Plantations are now capable of supplying more than 80% of the oil derived from ti tree *(Melaleuca alternifolia)*, and the whole of Australia's timber requirements (Clark 1995). In a nation with one of the highest per capita outputs of CO_2 to the atmosphere (Beder 1993), ecologically sustainable development demands that we plant ahead for our needs, and stop cutting down the indigenous forest trees that not only build up a reservoir of fixed carbon, provided they remain alive, but at the same time protect the soil and provide habitat for our shrinking fauna. If the global rate of increase in atmospheric CO_2 concentration is not brought to zero, the nutritional quality of the major annual cereals, wheat, rice, barley and oats, will very soon be compromised (Murray 1995a,b; 1997). Balancing the carbon dioxide equation is the bottom line for ecologically sustainable development.

In South Australia, Australian Native Produce Industries Pty Ltd has established a nursery and plantation in order to maintain their supplies of native plant products (the 'Red Ochre Collection'). An estimated 30,000 *Acacia* seedlings are included in the plantation. Robins Bush Foods also supports plantation and home garden production (Robins 1996). Bush Tucker Supplies Australia is planning a co-operative plantation venture around Broken Hill, with the support of the Rural Industries Research and Development Corporation (RIRDC). This company is also encouraging macadamia growers to diversify. Australian farmers and horticulturists have been told for generations to diversify - it is the obvious and the only way to survive. I foresee enormous potential for 'sugar cane replacement therapy', as degraded cane country is reclaimed for indigenous wetland and rainforest plants, including those that provide edible fruits and nuts.

The inauguration of sustainable seed production from arid zone *Acacias* is a model for how sustainable production should proceed. Despite the inherent limitations of *Acacia* seeds as human food, these are plants that belong to the areas where they are being planted. They also provide a source of food for emus and witjuti grubs, and act as host plants for the quandong. An active propagation program has seen the establishment of *Acacia* nurseries by the Pitjantjatjara, and planting out of key

species in Umuwa in the north-western corner of South Australia. Collaborative research is in train to select genotypes that have a preferred shape and produce the most seeds per plant (Peter Lister, University of Western Sydney Hawkesbury Campus, personal communication).

Conclusions

"Agricultural practices that rely heavily on applications of expensive nitrogenous fertilizers and pesticides are no longer sustainable." (Murray, 1991, p. ix). However, most of our indigenous plants are adapted to growing with the low soil contents of mineral nutrients generally found in this country (Davidson and Davidson 1993), and to the normal water regimes, with their wide fluctuations and periodic drought. Where legumes such as *Acacia* are concerned, a symbiotic nitrogen-fixing capacity is provided that benefits the whole ecosystem. Native plants produce their own pesticides (hence our problem with some of their toxins). Accordingly, ecologically sustainable development of indigenous species as human food sources is an achievable and a desirable objective.

Success in attaining this objective requires a major shift in attitude to past and present landuse practices. Many parts of Australia should never have been cleared and farmed. This is widely acknowledged, yet land clearance continues in sensitive remnant areas for trivial purposes, and at rates that have been officially underestimated (Butcher 1995). In fact, "In the last 50 years as much land was cleared as in the 150 years before 1945." (Glanznig, 1995, p. 1). This wanton vandalism must cease. Considering what is at stake, in terms of carbon balance, wildlife protection, and the quality of human life in the future, "let us bestir ourselves, ere it be too late."

Those who are now committed to indigenous food consumption can help considerably in promoting conservation of our fauna and flora. But they need to pay more attention to the presence of known toxins in some bush food products, and to the incidence of potentially transmissible diseases in animals killed for food. Furthermore, assurances that indigenous species being consumed have been obtained without adverse impact on wild populations must be given, and these guarantees must be independently verifiable. These strictures must also apply to yabbies and seafoods. There will be particular difficulties with witjuti grubs, although confining harvests to particular species of plants may help. No tree should be felled to extract wijuti grubs, except pest species such as willow (*Salix* spp.). Native aniseed *(Backhousia anisata)*, the Davidson plums (*Davidsonia* spp.)

and the magenta lilly pilly *(Syzygium paniculatum)*, all rare or endangered species, should come off the menu altogether.

We should at all costs avoid the situation that occurs in the south of the People's Republic of China and in Hong Kong, where endangered species are routinely placed on the menu for the sake of the foreign exchange they will bring from tourists. This is the antithesis of ecologically sustainable tourism. Effective public health regulations and tougher protected species legislation are both warranted throughout Australia, but the presence of these safeguards will promote public confidence in indigenous food supplies. Their real future will emerge when they move away from the restaurant to the home kitchen and table.

Acknowledgements

I am indebted to Michael Lambert for his first-hand investigation of restaurant offerings, Robert Spooner-Hart for information on witjuti grubs, and Peter Lister for helpful discussion of his *Acacia* project "Mai aliti palyaringkunytja". Thanks are due to Peter Lister, Steve Clarke and Trevor Hawkeswood for lending slides. I also thank the Linnean Society of NSW for research grants from the Joyce W. Vickery Scientific Research Fund.

Bibliography

Absolom, J. and Absolom, R. 1982, Outback Cooking in the Camp Oven, The Five Mile Press, Melbourne.

Anonymous. 1984, Aboriginal bushfoods study arouses wide interest, The Gazette and Letter to Graduates, The University of Sydney, Vol. 4(9), p. 3.

Ashcroft, W.J. 1977, Preliminary investigations into the seed proteins of selected members of the genus *Acacia*, Honours year thesis, Botany School, University of Melbourne, Melbourne.

Ashcroft, W.J. and Murray, D.R. 1979, The dual functions of the cotyledons of *Acacia iteaphylla* F. Muell. (Mimosoideae), Australian Journal of Botany, Vol. 27, pp. 343-352.

Bailey, F.M. 1909, Comprehensive Catalogue of Queensland Plants, 2nd Edition, Government Printer, Brisbane.

Beder, S. 1993, The Nature of Sustainable Development, Scribe Press, Newham.

Bell, E.A. 1984, 'Toxic compounds in seeds', in Seed Physiology, Vol. 1 Development, ed. D.R. Murray, Academic Press, Sydney, pp. 245-264.

Bradke, A.B. and Murray, D.R. 1989, Redistribution of amino acids and amides during seedling development in *Acacia iteaphylla* F. Muell. (Fabaceae: Mimosoideae), Proceedings of the Linnean Society of NSW, Vol. 111(1), pp. 37-42.

Brand, J. and Maggiore, P. 1992, 'The nutritional composition of Australian *Acacia* seeds', in Australian Dry-Zone Acacias For Human Food, ed. A.P.N. House and C.E. Harwood, Australian Tree Seed Centre, Canberra, pp. 54-67.

Brand, J.C., Cherikoff, V. and Truswell, A.S. 1985, The nutritional composition of Australian Aboriginal bushfoods. 3. Seeds and nuts, Food Technology in Australia, Vol. 37, pp. 275-279.

Brand, J.C., Rae, C., McDonnell, J., Lee, A., Cherikoff, V. and Truswell, A.S. 1983, The nutritional composition of Australian Aboriginal bushfoods, Food Technology in Australia, Vol. 35, pp. 293-298.

Butcher, David. 1995, Stripped bare, Letters, The Sun Herald, September 17, p.49.

Calaby, J.H. 1977, Changing the face of a continent, Australian Natural History, Vol. 19(2), pp. 62-65.

Cameron, P.M. 1994, Toxicology of Australian native plants, Australian Biologist, Vol. 7, pp. 120-128.

Cherikoff, V. and Isaacs, J. 1989, The Bush Food Handbook, Ti Tree Press, Sydney.

Clark, J. 1995, Australia's Plantations - Industry, Employment, Environment, Environment Victoria, Melbourne.

Cribb, A.B. and Cribb, J.W. 1976, Wild Food in Australia, Fontana, Sydney.

Davidson, B.R. and Davidson, H.F. 1993, Legumes: The Australian Experience, Research Studies Press, Taunton, England.

Denny, M. 1992, Historical and Ecological Study of the Effects of European settlement on Inland New South Wales, A Report by the Nature Conservation Council of New South Wales to the Heritage Council of New South Wales, Sydney. [First published in 1987].

Floyd, A.G. 1990, Australian Rainforests in New South Wales, Volume I, Surrey Beatty & Sons, Sydney.

Francis, W.D. 1929, Australian Rainforest Trees, Government Printer, Brisbane.

Glanznig, A. 1995, Native Vegetation Clearance, Habitat Loss and Biodiversity Decline, Biodiversity Series, Paper 6, Biodiversity Unit, Department of the Environment, Sport and Territories, ACT.

Gould, J. 1863, Mammals of Australia. Vol. II. Republished as Kangaroos, 1973, with commentary by J. M. Dixon, Doubleday & Company Inc., New York.

Guilfoyle, W.R. 1884, Australian Botany, 2nd Edition, George Robertson, Melbourne.

Hawkeswood, T. 1987, Beetles of Australia, Angus & Robertson, Sydney.

HRDC (Horticultural Research and Development Corporation) Research Report. 1993/1994, p.11.

Isaacs, J. 1987, Bush Food - Aboriginal Food and Herbal Medicine, Lansdowne, Sydney.

Kruszelnicki, K. 1993, Bizarre Moments in Science, ABC Books, Sydney.

Low, T. 1989, Bush Tucker - Australia's Wild Food Harvest, Angus & Robertson, Sydney.

Lunney, D. and Grigg, G. 1988, Kangaroo Harvesting and the Conservation of Arid and Semi-arid Lands, Special Edition, Australian Zoologist, Vol. 24(3), pp. 121-193.

Macoboy, S. 1994, Trees For Flower and Fragrance, The Book Company International/Lansdowne, Sydney.

McBarron, E.J. 1976, Medical and Veterinary Aspects of Plant Poisons in New South Wales, Department of Agriculture NSW, Sydney.

McGee, C.M. and Murray, D.R. 1986, Comparative studies of acid glycosidases from three legumes, Annals of Botany, Vol. 57, pp. 179-190.

Meade, K. 1995, US cattle surplus trammels local beef producers, The Weekend Australian, September 30 - October 1, p.6.

Morely, B.D. and Toelken, H.R. 1983, Flowering Plants in Australia, Rigby, Sydney.

Murray, D.R. 1984a, 'The seed and survival', in Seed Physiology, Vol. 1 Development, ed. D.R. Murray, Academic Press, Sydney, pp. 1-40.

Murray, D.R. 1984b, *Acacia* seeds as food, Australian Plants, Vol. 13, pp. 25-26.

Murray, D.R. 1986, Seed Dispersal, Academic Press, Sydney.

Murray, D.R. 1991, Advanced Methods in Plant Breeding and Biotechnology, C.A.B. International, Oxford.

Murray, D.R. 1992, The application of seed protein electrophoresis to questions of phylogeny, in 'Biogeography and Phylogenetics of the Pacific Flora' Symposium, 43rd American Institute of Biological Sciences Meeting, Hawaii; American Journal of Botany (Supplement), Vol. 79, No. 6, p. 2.

Murray, D.R. 1994a, Seed longevity and germination, The Australian Garden Journal, Vol. 14(1), pp. 40-42.

Murray, D.R. 1994b, The Illawarra flame tree, The Australian Garden Journal, Vol. 14(3), pp. 25-27.

Murray, D.R. 1995a, Carbon dioxide and plant growth, The Australian Garden Journal, Vol. 14(4), pp. 55-58.

Murray, D.R. 1995b, Plant responses to carbon dioxide, Special Invited Review, The American Journal of Botany, Vol. 82, pp. 690-697.

Murray, D.R. 1995c, 'Plant breeding', in Gale Encyclopedia of Science, Gale Research Inc., Detroit, Michigan, USA.

Murray, D.R. 1997, Carbon Dioxide and Plant Responses, Research Studies Press, Taunton, U.K.

Murray, D.R. and McGee, C.M. 1986, Seed protein content of Australian species of *Acacia*, Proceedings of the Linnean Society of NSW, Vol. 108(3), pp. 187-190.

Murray, D.R. and Roxburgh, C.McC. 1984, Amino acid composition of the seed albumins from chickpea, Journal of the Science of Food and Agriculture, Vol. 35, pp. 893-896.

Murray, D.R., Ashcroft, W.J., Seppelt, R.D. and Lennox, F.G. 1978, Comparative biochemical and morphological studies of *Acacia sophorae* (Labill.) R.Br. and *A. longifolia* (Andrews) Willd., Australian Journal of Botany, Vol. 26, pp. 755-771.

Oakman, H. 1984, Colourful Trees for Australian Gardens, Bonza Books, South Yarra, Victoria.

Petrie, J.M. 1908, The role of nitrogen and its compounds in plant metabolism. Part ii. The non-protein nitrogen in seeds, Proceedings of the Linnean Society of NSW, Vol. 33, pp. 835-844.

Robins, J. 1996, Wild Lime, Allen and Unwin, Australia.

Schulz, D. 1990, Should we farm wild animals?, Today, Vol. 1(5), pp. 43-45.

Seed Savers' Network Newsletter. Spring 1995, No. 19. The Seed Savers' Network, P.O. Box 975, Byron Bay NSW 2481.

Sherrie, W.M. 1919, The kangaroo, P.F.A. (Pastoral Finance Association Limited) Quarterly, Vol. 6, No. 22, pp. 31-32.

Simmons, M. 1981, Acacias of Australia, Thomas Nelson Australia, Melbourne.

Weder, J.K.P. and Murray, D.R. 1981, Distribution of proteinase inhibitors in seeds of Australian *Acacias*, Zeitschrift fur Pflanzenphysiologie, Vol. 103, pp. 317-322.

Zola, N. and Gott, B. 1992, Koori Plants Koori People, Koori Heritage Trust, Victoria.

ILLEGAL TRAFFICKING IN AUSTRALIAN NATIVE WILDLIFE

by Debra Callister,
Director, TRAFFIC Oceania

TRAFFIC Oceania is the Australian-based office of the world's largest wildlife trade monitoring non-government organisation. Deb Callister has carried out extensive research in Australia and overseas on wildlife trade, on issues as diverse as Australia's mutton bird industry, illegal timber trade and use of endangered species in traditional Chinese medicine.

(The following is an edited transcript of her presentation)

Introduction

I'll be talking to you this morning about illegal trafficking in Australian native wildlife. Some of my presentation will draw from information and experiences I received the week before last, when attending the Australasian Wildlife Law Enforcement Seminar, a meeting of State and Federal Wildlife Law Enforcement Officers from Australia and New Zealand, convened to discuss issues relating to wildlife trade and make recommendations on ways to improve the enforcement of Australia's wildlife laws.

Before I get into the detail, there are some things I will be unable to tell you. I cannot tell you, for example, how big the illegal trade in Australia's wildlife is. I cannot put a dollar value on it. There simply is not enough information out there to make such assessments. The very nature of illegal trade stops us from ever really knowing what its absolute value is. We simply cannot accurately determine the scale of Australia's illegal wildlife trade.

I also will be unable to tell you too much about the impact of illegal wildlife trade on wild populations of animals. We can make some informed guesses about the impacts for a limited number of species, but by and large we do not know a lot about what the impacts really are.

Having just said that we cannot estimate the scale of Australia's illegal wildlife trade, I am probably going to contradict myself now, by giving you some Interpol figures on the estimated value of the world's illegal wildlife trade. Interpol

estimates that the annual illegal value of wildlife shipments around the world is in the vicinity of $US 5 billion a year - certainly not an insignificant trade. They also estimate that the illegal wildlife trade is the second biggest black market after the drug trade, and that it is more profitable globally than the illegal arms trade. So we are not talking about an insignificant backyard industry run by few people who like to keep a few pets. It is a significant illegal industry run by people who are very highly organised criminals and who control some very highly organised syndicates.

In the Australian context there are basically two forms of illegal trade - the illegal domestic trade and the illegal export trade. Many people would be aware of problems with illegal export of Australian native wildlife, and would have seen pictures of birds shoved in plastic tubes, drugged and stuffed in suitcases and such things in the media. What is less well known by the public is that there is also quite a significant and ongoing trade within Australia to service our own domestic wildlife industries.

What animals are involved in Australian wildlife trafficking?

On the fauna side, birds are a very popular, particularly parrots. Illegal bird trade will be discussed in more detail shortly. Reptiles also, are in ongoing demand. There is also a market for Australian amphibian species.

In addition, there is a market for the less likely-sounding taxa such as insects. A few years ago TRAFFIC looked at the demand for Australian insects in some European markets. We found that the they were available and being advertised in European entomological magazines. One German magazine was advertising an Australian species of beetle for over $1,000 per single beetle. These species required permits for export and most if not all appeared to have been illegally exported.

There is illegal trade in fish, and other marine species such as abalone. In Victoria, for example, there is a specialised Law Enforcement Unit targeting things such as a very significant and lucrative illegal international trade in abalone.

Information on illegal trade in mammals is less concrete. There are reports or rumours from time to time about illegal trade in Australian mammals, particularly reports of wallabies turning up in overseas markets and so on. But I have to say in the time I have been involved in TRAFFIC - almost 8 years - I have never seen any evidence that could substantiate an illegal export trade in live Australian mammals. This does not mean that it does not occur, but I simply

have seen no good evidence that it is happening. If it is, it certainly is not on any significant scale.

With flora, all sorts of taxa - orchids, palms, tree ferns, carnivorous plants and so on - are illegally traded. Some examples will be given shortly.

Bird Smuggling

The birds in most demand by illegal traders are parrots, particularly cockatoos. There are certain other species that are targeted, for example finch species. The principal destination for the illegal finch trade is the domestic market, whereas with parrots there is both domestic and international demand.

On the international scene, the main destinations for Australian parrots and cockatoos are the USA and the UK, with New Zealand also being a very significant player. Apart from the demand for their local market, New Zealand plays an important laundering role in the export of Australian native wildlife. Birds are smuggled into New Zealand, given an export permit, and then are sent out "legally" to another country.

Following are some examples about species and incidents.

A few years or so ago a light plane was detected in New Zealand that had illegally entered the country with a shipment of birds, including Major Mitchell and Gang Gang Cockatoos. This indicates the level of sophistication and the methods and lengths that smugglers in Australian wildlife will go to.

One of the really popular target species for the trade is the Major Mitchell or Pink Cockatoo. I have heard people in the law enforcement community suggest that up to 80% of the Major Mitchells that are held by people here in Australia have been sourced illegally from the wild. I have also heard cases where nests of this species in certain parts of the country have been targeted for nest robbing routinely for 30 to 40 years. It is difficult to determine what impact this is having on the Major Mitchell Cockatoo. However, there is growing conservation concern for some of the localised populations of Major Mitchells, particularly some of the Murray-Darling populations, which is one of the areas popular with trappers. At the recent Australasian Wildlife Law Enforcement Seminar, this was one species that was mentioned time and time again as being of particular concern to enforcement agencies, and also one that was being principally targeted in their law enforcement activities.

Golden-shouldered Parrots are interesting in that they are probably one of the few or perhaps even the only Australian bird species where trapping really has been one of the major threatening processes for wild populations. While habitat destruction has also been and continues to be a major threat to Golden-shouldered Parrots, populations also suffered from illegal trapping.

One of the really popular species for smuggling both here in Australia and overseas are the various species of black cockatoos (but probably less so the Glossy Blacks, because they are believed to be much harder to keep due to their specialized diets). There are a few localised populations or sub-species of black cockatoo that are threatened, such as the Victorian sub-species of the Red-tailed Black Cockatoo, however we have no evidence that they are under any major threat from illegal trapping. There are concerns about some of the White-tailed Black Cockatoo species in Western Australia, which are being hard hit principally by habitat destruction (one of the major threats is loss of nesting hollows), however, they are also being targeted for illegal nest robbing.

A few years ago, most of the illegal trade appeared to be in live birds. While that is probably still the case in some instances, now more and more the most common trafficking methods involve using eggs. This can involve nest robbing then smuggling the eggs overseas in a special egg-vest. Smuggling eggs has many advantages, not the least of which is that it is much easier for concealment. Also, when the smuggler arrives overseas, the eggs can be hatched, a leg-ring put on the chicks and, if you have two adult birds of the same species, it is easy to claim that you bred them from these birds.

So, back to black cockatoos - there is a big demand for them overseas. For example, in the Netherlands TRAFFIC did some work on the availability of Australia parrots in 1991 and found that there was not a single black cockatoo in the country. A couple of years later the authorities mounted a major law enforcement effort relating to black cockatoos and Gang Gangs and seized in the vicinity of 50 birds. It appears that overseas demand is shifting away from some of the more common species such as the Galahs and Sulphur-crested Cockatoos towards species such as Major Mitchell Cockatoos, Gang Gangs and black cockatoos.

At present there is a case being prosecuted in the USA involving bird smuggling from Australia, involving about $US 1.5 million worth of eggs smuggled out of the country over a number of years. A final example of overseas smuggling is the case busted in Western Australia in late 1994 that involved individuals from

South Africa, New Zealand, the UK and Australia, sending native birds out of Australia and importing exotic species in. These are just two of many examples that indicate the scale of bird smuggling from Australia and that it can be a highly organised criminal activity.

At the local level, there is talk that there is an increasing take of wild stock of commonly kept aviary birds, in order for aviculturists to get genetically pure aviary stock.

There are things being done to try and stop this illegal trade. One approach that has had some significant benefits locally is DNA testing of birds by law enforcement agencies. This has resulted in quite spectacular plummeting in the claimed level of breeding success of certain bird species. In Western Australia, for example, they did DNA tests on a number of black cockatoos and found that only one of the many birds that people had claimed to have been captive bred was legitimate.

Work is also being done on ageing and sexing schemes, such as how to recognise whether a bird is young, using assessment of feather patterns and so on. This allows law enforcement officers to immediately visually detect such things as whether the birds that are claimed to be the progeny are in fact older than the parents.

Reptiles

It is a harder to get information about what is going on with illegal trade in reptiles. Herpetologists appear to be a less high profile group than aviculturists, putting out fewer publications, being less vocal about their activities and so on. This makes it more difficult to make assessments about reptile trade as an outsider.

However, reptiles being targeted for the illegal market include pythons, green tree snakes, turtles, monitor lizards, and even common species such as shingleback lizards, which can fetch quite astronomical prices in Japan. Again it is hard to say how big the domestic and export markets are.

Plants

You may have heard about the Foxtail Palm case in Far-north Queensland, where authorities uncovered a large-scale ongoing illegal operation involving taking seeds from plants in Cape Melville National Park, where they are endemic, for

both the domestic market and export overseas. Another example of illegal plant trade is the Dutch national who was detected recently moving across Northern Australia into Western Australia collecting and posting out orchids and plants such as sundews as he went. Tree ferns are another case where there is a significant illegal trade. In Victoria, for example, you are not supposed to sell tree ferns without tags on them. However, you do not have to look very hard, or go to too many nurseries, to find tree ferns that are being sold without tags.

Conclusions

There are some who express attitudes such as - Why should we bother? Why put in all this law enforcement effort? It is important to remember is that what we are talking about is illegal trade. We have wildlife conservation laws for a reason, and unless and until they are changed, they are the law - we have to respect them and we have to enforce them. That is the bottom line.

One problem with counteracting illegal wildlife trade, is inconsistencies in laws across the nation. The need for more national co-ordination was an issue that kept coming up at the recent law enforcement seminar I attended. This may not necessarily mean that all States and Territories have to have the same laws. It could just mean that for individual species where there are targeted law enforcement efforts across the nation, the situation does not arise where the law or policy in one State hinders or undermines what another State is trying to do to conserve its wildlife that is being targeted for the illegal market.

There is a role in combatting illegal wildlife trade for the public - they can be vigilant and inform on people - and this has happened. They need to remain alert and assist in efforts to stop the illegal trade.

Regarding impacts on wild populations, while there are always going to be concerns, there is no evidence at the moment that any Australian species is currently being threatened with extinction because of illegal trade. Some species, however, are almost certainly suffering localised negative impacts. By its very nature, illegal trade is always going to be uncontrolled, so there are never any guarantees as to the sustainability of any wildlife trade which is not being managed under a properly controlled harvesting regime.

To conclude, illegal trade in Australian native flora and fauna is ongoing. As long as it continues it represents a potential threat to populations of native wildlife. Consequently, we should continue to support efforts to enforce our conservation laws, and bring about a halt to illegal wildlife trafficking.

Editor's Note

LIVE EXPORTS OF NATIVE BIRDS: RAOU Policy

At the *Sustainable Use of Wildlife* seminar, Dr. Michael Hutchison addressed the Royal Australasian Ornithologists Union (RAOU) Policy on the Live Export of Native Birds.

The RAOU is now known as *Birds Australia.* At the time of the seminar, their Policy was in Draft form. When these proceedings went to press (July 1997), their Policy still had not received final endorsement, and for this reason *Birds Australia* were unable to permit it to be published.

It is understood that the Draft Policy, now entitled *"Harvesting and Trade of Australia's Native Birds"* will be finalised and released by *Birds Australia* in the near future.

SUSTAINABLE USE OF WILDLIFE:
Utopian Dream or Unrealistic Nightmare?

Session C

NON-CONSUMPTIVE USAGE OF INDIGENOUS WILDLIFE

ECOTOURISM: IS IT A SUSTAINABLE USE OF WILDLIFE?

Dr. Dedee Woodside,
Director, Environment, Education and
The Australian Conservation Training Institute,
Zoological Parks Board of NSW

Dedee Woodside is an Executive member of the Zoological Parks Board of NSW, and Director for Environmental and Educational Programs. She has a Doctorate in Zoology specialising in the behavioural ecology of Australian Mammals and population biology. She began work at Taronga Zoo in 1985 as Curator of Mammals, and has since established the first Conservation Research Centre in Australasia. Her major current focus is to facilitate the international exchange of practical skills to 'enable' others in environmental and wildlife management to perform effective conservation. Ecotourism training provides a particularly important challenge to Dedee. Apart from designing ecotourism programs for the Zoological Parks Board of NSW, she is also establishing, with her family, a Wildlife Study Centre and Bush Retreat at Barrington Tops, NSW.

Introduction

Ecotourism is a phenomenon of the 'nineties', and a generic term given to recreation and travel associated with natural and cultural values. It is the fastest growing segment of the international tourism market, and Australia is seen as one of the world's leading ecotourism destinations. The sudden rise in popularity of this form of travel and the potential for over-exploitation of Australia's natural and cultural assets has led most governments at all levels (local, state and federal) to develop ecotourism strategies (DoT 1994; QoT 1997). There is an underlying fear that if such strategies are not developed, the new industry will grow out of control and, in the wrong hands, it will cause costly or irreparable damage. There are already far too many examples where poorly managed tourism has destroyed wildlife populations, their habitats and the human settlements that depended on them.

Ecotourism, if well planned and managed, is a sustainable use of wildlife. Under ideal circumstances the entire focus of an ecotourism operation is one of ensuring sustainability (Blamey 1995). Indeed, the definition adopted by the Australian government is *"nature-based tourism that involves education and interpretation*

of the natural environment and is managed to be ecologically sustainable". Ideally, ecotourism would ensure that the infrastructure and the activities of the tourists are planned to have little impact and that all potential impacts are monitored and adjustments made to the business to ensure that it operates within the carrying capacity of both the natural and cultural environments. It would ensure that local people were trained and employed, that local materials and services were used and that income generated benefited the natural resources upon which the ecotourism operation is based. It would ensure that every visitor gained insight into the natural resources, especially the wildlife, and would encourage a sense of ownership or responsibility in the visitors, that they would take with them.

In reality, 'ecotourism' has been a misused word, a handy niche-marketing ploy and an opportunity to attract a clientele who are often willing to pay more for an exclusive, small-scale experience that appears to do little damage and provides privileged access to natural areas. In reality, little has been done to monitor the impact of this kind of tourism on natural areas or more specifically on wildlife. The few studies that have been done show that even the best planned programs have some effect.

Ecotourism is in principle a sustainable use of wildlife and in some countries it is a term used broadly to embrace both consumptive and non-consumptive forms of wildlife use. In Tanzania, for example, hunting is viewed as a legitimate form of ecotourism, just as sport-fishing is regarded as a legitimate form of nature-based tourism in parts of Australia. For some, the term ecotourism is reserved for use only with non-consumptive uses, while for others it is applied to all aspects of human interaction with wildlife that provide an opportunity to learn more about local culture and its relationship with nature.

To avoid debate about the rights or wrongs of hunting and fishing or any other form of consumptive use of wildife, I will refer only to the operating principles of ecotourism and ask whether or not it is in principle, a sustainable industry with regard to both wildlife and local cultures, as well as what mechanisms must be put in place to ensure that it operates effectively. I will give a brief overview of ecotourism development and perspectives in Australia and will also look at ecotourism from a broader international perspective, especially that of less developed nations where a more flexible definition of ecotourism than that used in Australia may be appropriate in the short-term.

By being flexible and open we might encourage development of an industry which may lead to a greater value being placed on wildlife and its habitat and provide incentives to manage it in a sustainable manner in the long-term. In such cases it is often important to widen the scope of ecotourism to enable the development of a range of small-scale and non-destructive industries as alternatives to large-scale forestry or mining options presented by foreign operators.

The Basic Criteria for Ensuring Ecotourism is Sustainability

For ecotourism to be truly regarded as sustainable use of wildlife, there are a number of basic criteria that should addressed, including criteria that affect planning of the industry as a whole and those which affect day-to-day operations (Linberg 1991). There are necessarily different criteria which should be addressed by government, wildlife agencies, and individual ecotourism operators. They reflect the different scales at which each level is operating, their different responsibilities and authority to affect change, the differences in the goals at each level and the differences in the time frame over which these institutions can plan. These criteria are listed below and are presented as the minimum that must be in place to ensure that this, or any other similar industry, is managed to be sustainable.

1. Baseline Information and On-going Research

It is important that a basic inventory of natural and cultural assets is undertaken and that information is gathered on the biodiversity, ecological constraints, risks and potential of an area before it is developed. It is not enough to undertake a stand-alone EIS for each new ecotourism operation since issues such as carrying capacity and required ongoing monitoring can rarely be addressed for a single site. It is incumbent on the appropriate wildlife and natural resource agencies to undertake research with regard to these issues and utilise the private operators or visitors to achieve ongoing monitoring programs. It is also incumbent on the appropriate tourism agencies to encourage ecotourism in areas where sufficient information already exists and where methods of site management are already prescribed. Where such information is not known, it is important that a precautionary approach is utilised and ecotourism is developed under a blanket of appropriate constraints. Criteria should be drawn up to deal will all contingencies and should be used concurrently with establishing an overall regional tourism plan and research program.

2. Regional Environmental Protection and Management Strategy

Based on the research information gained above, on historical knowledge, spiritual values, and on precautionary principles in management, a regional strategy should be developed for the protection of the natural environment. Included in this is access to and utilisation of wildlife. The ground rules for observing wildlife at night or by day, of interfering with their behaviour through feeding, intensive disease management, etc., must be worked through. In some cases, such as the Mountain Gorillas of Uganda and Zaire, one of the greatest risks to their long-term survival is transmission of diseases from humans especially tourists. These and other risks should not be overlooked. There is, for example, considerable concern that regular and unmanaged spotlighting of gliders and possums in some areas is interfering with feeding and mating behaviour and exposing them unnecessarily to predation. Similarly boats entering wetlands or travelling through crocodile habitat may adversely affect the crocodiles that such tours come to see. Separately, each spotlighting or similar animal watching tour may seem innocent enough, but the cumulative effect must be considered in a regional plan, guidelines established for this and a wide range of similar activities, and the effects monitored. For migratory species, it is essential that similar guidelines and management plans are drawn up for each area of their critical habitat along their route.

The ecotourism operators should be directly involved in both development and implementation of management strategies. As direct stakeholders, they should contribute to monitoring programs, funding for the programs (perhaps through licences, etc.) and compliance with the management plans should be a condition of operation.

3. Flexible Marketing and Business-Response Capability

Before ecotourism operations are approved they should show evidence of good business planning and evidence that they are capable of responding to changing conditions in the environment in which they are operating. An ecotourism operator who is pushing the limit of visitor numbers on a daily basis is not likely to respond well if some wildlife area or species becomes "off-limits" for a period of time. It should be an essential part of good planning to build in such flexibility, to ensure all natural areas have some recovery time, and that this is seen as responsible management. Such management can, furthermore, be used well in marketing of genuine ecotourism products.

4. Cooperation and Regional Marketing

One of the most effective mechanisms for ensuring that impacts are being monitored, that business can respond to changing needs of wildlife and that long-term management plans are being implement, is through regional marketing and management programs. Local ecotourism operators benefit most from this as they share the peak load of tourism and share in the cost of marketing to attract visitors at other times. No one operator is saddled with monitoring programs or wearing the burden of change if the needs of the wildlife are such that some activities must be curtailed. This requires both a cooperative spirit and economic incentive to succeed and there are many mechanisms for achieving this. For itinerant operators, cooperation with any local consortiums may have to be a condition of licence and should be a fundamental component in business planning.

5. Formal Licensing/Bonding and Operation Procedures

Licensing is currently a very complicated process and involves different procedures for different jurisdictions. Depending on who the managing authority is, (National Parks, Maritime Services, Land and Water Conservation, etc.), the procedures and criteria for operation can vary markedly as does the cost, follow-up and duration of licensing. It is essential that there is some common or collaborative system for licensing ecotourism activities and that a common set of strict guidelines is established and monitored. Without this, we can have a situation where a single population of animals are managed differently on land where two managing authorities abut and as a consequence ecotourism activities may work to different rules in one small space. The wildlife does not know the boundaries and can be seriously affected by lack of consistencies.

It is also important that licensing fees are substantive enough to be meaningful to the operator and that through payment of those fees certain services are delivered to the operators. These may include provision of public amenities at some sites, interpretive information, operator training on the ecology of the area, impact monitoring programs, etc. For large operations and facilities, it may be appropriate to demand a bond which ensures that any environmental damage is ameliorated.

6. Training for Ecotourism Planners and Operators

One of the most important tools for ensuring that this industry is truly sustainable is through building the capacity of all licensed operators to understand the constraints of the natural systems on which they depend and to work with that information to optimise their business opportunities. This can best be achieved

through regular training, which should be a condition of licensing approval or renewal. A range of relevant programs should be prepared and accredited or recognised by the licensing authorities.

7. Appropriate Technology and Infrastructure Development

The development approval process has so far been the only way to ensure that developments are appropriate for their site. The standard EIS approach to each development is limited when applied to ecotourism as it does not demand best practice in all environmental aspects, nor demand use of local materials, ongoing resource conservation and waste minimisation, etc. While the voluntary accreditation process now managed by the Australian Ecotourism Association is an important first step in addressing these issues, it will not fully address the problem until it is part of a compulsory process for demanding the best planning and management standards from all ecotourism operations.

8. Industry Development Strategy

Because the vision and principles of ecotourism set it clearly apart from other mass tourism, it is important that it is developed according to a well-structured plan and that all the appropriate support is put in place. This will help to ensure that tourism 'nodes' are established with facilities, hardened pathways, etc. for regular use, that information is made available to operators and tourists, that the right kind of tourist is attracted to the ecotourism activities, that benefits are returned to the resources upon which the industry depends, that rules of operation are consistent, and that it is a high quality experience for the visitor. Ecotourists around the world demand high standards in the products they purchase, and they expect good quality information and intimate experience. This includes self-reliant tourists, those participating in small organised groups and those visiting the more popular or recreational sites. To meet this demand in a sustainable way, ecotourism must be well planned at the highest level.

9. Involvement of the Community

Local community involvement in ecotourism development is a key to its long-term success. Members of the local community are key stakeholders and should participate in the identification of natural and cultural values of their area, management and planning of the industry, individual product development, marketing and promotion and monitoring of the impacts. Active participation by the community moves them into an essential role as shareholders benefiting from the success of the industry at the local level and vigilant of any impacts or

problems with the local wildlife or culture. This involvement increases the value of wildlife in the community and insures its protection.

10. Closed Loop for Benefits to the Local Community

It is important that the local community gains some advantage from all the various revenue schemes associated with ecotourism and is able to see secondary financial benefits in a reasonably short period of time. The revenue collecting authority may opt for direct revenue sharing with the adjoining communities (anywhere from 12% to 25% of the direct income), or they may invest in local infrastructure development, education, welfare issues, or small development grant schemes. There is no limit on the variety of ways in which revenue can be shared, but this must be done. It this does not occur, there is little incentive for the community to value its local wildlife or other natural resources or to put extra effort into its management or monitoring. Likewise, if one area is used as a "cash cow" to support other areas without special privilege going to the locals, the motivation to assist will die. This is a critical aspect of management that is often overlooked by wildlife agencies and governments but it is essential if the community is to ensure that ecotourism or any other industry is sustainable.

The managing authority must also be mindful to reduce all the various points at which there is revenue leakage or unnecessary drainage. Often referred to as "closing the loop", this aspect of ecotourism is what makes it stand out from other forms of tourism.

11. Re-education of Travellers and Recreationists

Over a long period of time a whole population of users and potential users of wildlife can be educated to ensure that they reduce their own impact and demand high standards of all ecotourism operators. Well planned programs should be developed by the appropriate authorities and industry groups to reach all current or potential ecotourists. Advertising campaigns, school education, documentaries, pre-travel seminars and standard interpretative material in some natural areas will all influence the user. Private enterprise will respond to higher demands as consumers have the ultimate power in shaping the industry and ensuring its longevity.

An Australian Perspective on Ecotourism

Internationally, ecotourism is the fastest growing area of tourism, an industry which has expanded rapidly to embrace Australia more than ever before. Already, tourism in Australia is the largest earner of export dollars for this country and in 1993/4 it accounted for 11.7% of our export income. It employs more than 6% of the nation's employed population and in the 1993/94 financial year, the numbers of inbound tourists were 3.5 million people; the expectation is that by the year 2000 we will double that and have at least six million tourists annually. Interestingly, recent surveys have shown that the primary motive for travellers coming to Australia is its nature, particularly its wildlife (BTR 1994).

Many documents summarise the various government strategies for ecotourism, the importance of ecotourism to biodiversity conservation, if managed correctly (Preece et al. 1995), and the opportunities for designing showcases of appropriate and low impact technology through ecotourism. On an annual basis the latest in ecotourism ideas and case studies are presented at a national forum held by the Ecotourism Association of Australia and each year the number of participants expands beyond the predicted level (e.g., Weiler 1991). Clearly there is a keen desire to both participate in the industry and benefit from its nature-based products in Australia.

There are two very different viewpoints on the growth of ecotourism in Australia. The first is that ecotourism is a reflection of the need by Australians to renew their ties with nature, to experience open space, serenity and non-urban values for a while. As this is one of the most urbanised countries in the world, we may be suffering from our urban lifestyle. We may all have a real need to revitalise ourselves and reconnect with nature and this may turn out to be one of our most important survival strategies. We are fortunate to still have the opportunity to do so and are slowly learning to revalue such opportunities with nature. The recent and rapid development of the ecotourism industry in Australia might reflect all this, and our desire to develop industry standards and strategies might reflect our desire to protect nature and ensure that we have ongoing access to it for emotional and spiritual reasons. Or perhaps we are eager and curious to learn more about Australian wildlife and its habitats before they disappear (Richardson 1993). Either way we want to ensure that the benefits are maximised at a local level and ploughed back into the management of the natural resource (Figgis 1994).

The second view is a more cynical one in which Australian nature is simply viewed as a commodity to be exploited and the unique nature of Australian

wildlife is a valuable marketing tool in attracting international travellers to our shores. The encouragement of ecotourism with government incentives, etc. is, in this case, little more than exploitation of unique selling points in a new market that is opening up internationally. The controls and planning in this case might be based on the desire to control a new industry and to maximise its revenue earning capacity with little regard to returning benefits to the management of the natural resource at a local level. This view appears typical of the mass tourism sector in general, with ecotourism seemingly seen by many as merely a subset or niche market within mass tourism and deserving no special attention (Weiler 1993).

Both views are alive and well in Australia and continue to compete for attention at all levels of planning and management. Should the latter view win out, then we can be guaranteed that many of the criteria or mechanisms mentioned above for the appropriate management and planning of ecotourism will not be applied and the tourism will not be sustainable. However, many workers are optimistic that 'values' will prevail and that largely through the demand of the ecotourist, we will seek to plan and manage the industry according to ESD principles. In principle this can be done and the next few years will be critical in ensuring that ecotourism is implemented and supported in such a way that it is a sustainable use of wildlife (Linberg 1991; Moore & Carter 1993). It must also be understood that it is, by its nature, an industry with a ceiling for growth.

As individuals we can ask many questions about the activities we now call ecotourism and begin to demand a little more of ourselves and the operators to ensure that the industry is sustainable. We might ask, for example, whether there should be limits on the numbers of people visiting certain sites at certain times of year; whether it is appropriate to spotlight a group of animals night after night; to walk on muddy trails where damage is clearly being done; to build impervious walkways in national parks or reserves; to gather firewood around campsites; to encourage the feeding or touching of some wildlife; to collect shells on the beach; to presume that we should all have access to any natural area; to encourage close contact with cetaceans; to travel in large numbers to the coral reefs; and so on. We might question how we could reduce our own "footprints" during our travels and plan our trips a little better in terms of their environmental and cultural impacts. We might try to learn more about the natural and cultural aspects of the sites we visit and demand more publications to guide us. We might be willing to pay more for the best ecotourism experiences in the comfort that all this is taken care of and that the local community and local wildlife are benefiting from our visit, just as we are.

An International Perspective

Many of the generalisations I make about ecotourism in developing nations grow out my experience in providing training for ecotourism planning and management to professionals from sixteen different countries and following through with many of the programs on the ground over a period of time. The countries have been African, South East Asian, Indo-Chinese and from the South Pacific (including Australia) and have consequently involved many different cultures, histories, environmental problems, economic conditions, educational levels and wildlife issues. Virtually nothing about the local conditions were the same for any of the sixteen countries and approximately 120 individual case studies. Yet for each of the case studies the fundamental assumption was that ecotourism would provide a panacea solution to local development issues.

Ecotourism is thrown forward as a economic alternative to be discussed by governments of developing nations, an alternative to the major extractive or consumptive industries such as forestry and mining and an industry that might help locals hold on to the traditions and values they have grown up with. It may be a matter of great urgency that activities such as ecotourism are developed with communities who are desperately looking for income or who have experienced mass tourism and its effects or who wish to cash in on the growth of this industry globally. It is often seen as an acceptable and easy means of attracting foreign exchange and earning much needed local revenue.

Ecotourism has the potential, in some instances, of holding up false hopes to a community. All too often it is put forward as a solution without the necessary principles being understood or a full understanding of the levels of support required to make a sustainable industry survive. The same criteria mentioned earlier in this paper must be addressed in each of these situations. If for example, a community plans the perfect facilities, perfect nature experiences and appropriate cultural contact but finds that not enough tourists wish to visit, no reliable transport can get people to them, the trip would take too long or be too hard to organise for most travellers, or the product just can't penetrate the saturated advertising opportunities abroad, then a whole community can suffer and become despondent. They may have to turn to forestry, mining or foreign fishing rights to earn an income. Perhaps our model doesn't fit or the definition of ecotourism is too narrow for such situations.

Ecotourism can also move from a non-consumptive use of selective wildlife to a highly destructive and consumptive use of all forms of wildlife and their habitat.

There are many good examples of this in Africa in particular. The infrastructure is first established to accommodate interested visitors and then as impacts begin to appear and wildlife moves away, the tours follow it, opening up new areas. The new and often, uncontrolled market attracts an excessive number of operators and suddenly the ground is tramped with over use, communities are exploited and greedy operators take their profits, governments take what they can to prop up other industries and communities. The collapsing tourism industry reaches farther and deeper into the natural resource areas to stay afloat and the rot sets in - the natural assets are in a state of ruin. A completely unsustainable use of wildlife and its habitat has eventuated, with no one held directly responsible and virtually no ability to repair the damage.

The lessons I have learned from this are that ecotourism by definition is sustainable use of wildlife but by application is often a disaster and that this comes about not because the principles of operation are wrong but because the support and control mechanisms are not adequately implemented. Where it is difficult to set up a whole new set of industry standards, controls, etc., it is probably best to loosen the definition of ecotourism, to allow it to "piggy back" on some other existing industry with adequate controls and be seen as a mechanism for adding value to local wildlife. From that may grow the appreciation for other forms of sustainable use of natural resources (especially wildlife), other small scale industries, and the political will to set up appropriate mechanisms to support and enforce sustainable industries.

References

Australian Bureau of Statistics (ABS), 1996. Australia and the Environment, ABS Catalogue No. 4601.0 AGPS, Canberra.

Blamey, R. 1995. The Nature of Ecotourism. BTR Occasional Paper Number 21, BTR Canberra.

Bureau of Tourism Research (BTR). 1994. International Visitor Survey, Canberra.

Commonwealth Department of Tourism (DoT). 1994. National Ecotourism Strategy. AGPS Canberra.

Figgis, P.J. 1994. Fragile Lands: the Australian Experience: Nature Centred Visitation. Paper to the 1994 World Congress on Ecotourism and Adventure Tourism, Hobart, Tasmania.

Linberg, K. 1991. Policies for Maximising Nature Tourism's Ecological and Economic Benefits. World Resource Institute, Washington, DC.

Moore, S. and Carter, B. 1993. Ecotourism in the 21st Century. Tourism Management 13(2): 123-130.

Preece, N., van Ottersee, P. and James, D. 1995. Two Way Track - Biodiversity Conservation and Ecotourism: an investigation of linkages, mutual benefits and future opportunities. Biodiversity Series Paper No.5, Biodiversity Unit. GPS, Canberra.

Queensland Department of Tourism (QoT) 1997. Queensland Ecotourism Plan. QGP, Brisbane.

Richardson, J. 1993. Ecotourism and Nature-Based Holidays. Simon and Schuster, Sydney.

Weiler, B. (ed) 1991. Ecotourism Incorporating the Global Classroom: 1991 Conference Papers, University of Queensland, Australia. Bureau of Tourism Research, Canberra.

Weiler, B. 1993. Nature-Based Tour Operators: Are They Environmentally Friendly Or Are They Faking It? Tourism Recreation Research 18: 55-60.

A CASE HISTORY IN SUSTAINABILITY: PELICAN LAGOON RESEARCH & WILDLIFE CENTRE, KANGAROO ISLAND

by Mike McKelvey,
Director, Pelican Lagoon Research & Wildlife Centre

Mike McKelvey is a biologist, artist and writer who has worked in over 21 countries. He has been a resident of Kangaroo Island since 1970. The Pelican Lagoon Research and Wildlife Centre, a self-sufficient private facility which functions through biological sustainability, caters for international research teams from all disciplines. Much of the research is conducted within private sector lands which shelter some of the island's richest biodiversity.

The Pelican Lagoon Research & Wildlife Centre (PLRWC), Kangaroo Island, is a focus for long term field research. Incorporated in its philosophy is a deliberate attitude of minimizing human impact to maximize natural processes and insure biological sustainability.

A guiding principle in all interactions with the land has been that the researchers do not view themselves as being in control or managing the ecosystems. They are one part of the whole.

Biogeographical surveys were conducted in 1980-83 to establish data baselines and compare them with prior surveys and anecdotal information of the area as far back as 1950. This base became the working structure for present and future biological research.

The physical centre of the research area is based on private property. Island wide studies utilize ecosystems from private sector holdings as well as public lands. On Kangaroo Island some of the most biologically dynamic ecosystems exist within private sector holdings.

Research agreements are negotiated between scientists and private landholders. This procedure insures that the private sector is aware of the research needs, procedures and outcomes. It also reinforces the concept of a "biological stake" in the resource for landholder and researcher alike.

In 1982 the day to day management of PLRWC was given directly to the researchers who use the area. They formulate and carry out the policy which governs human sustainability in the area. Some immediate and ongoing areas of human attention are the impact of access, numbers of people present in the area, type and quantity of structures, provision and maintenance of utilities and management of refuse.

Access to an area is a major impact on natural systems. Several actions have been taken to minimize this problem at PLRWC. The area has been declared a vehicle-free space to minimize traffic and attendant wind/water erosion, to enhance the quality of the work experience and increase the aesthetic appreciation of the environment. One immediate and practical benefit from the elimination of unnecessary vehicle traffic has been the minimizing of influx from weeds and non-native vegetation species.

Foot traffic is designed to have minimal impact and all walkers are encouraged to wear "soft" footwear which does not have heavy tread or textured soles. Monitoring has demonstrated that "high-tech" walking boots with a variety of grip soles cause proportionally high impact on the fragile soils. Lightweight smooth shoes and attentive walking has reduced impact in sensitive areas to the point that "human trails" are comparable to native wallaby and kangaroo pads.

A base carrying capacity of humans was established for the area. Maximum numbers of people visiting and working in the area are controlled. Seasonal adjustments are based on the sensitivity of natural cycles. Influencing factors include climatic fluctuations, variations in animal activities and cycles within animal populations. The recognition of a maximum human carrying capacity has had a positive affect on the sustained use of the area.

A number of built structures were in place when the program began. It was decided that any future research structures would not be of the type to leave major constructions standing after a natural event such as wildfire, earthquake, etc. Comfortable and secure "soft accommodation" is provided in the form of spacious and transportable tents. To provide security for materials and equipment against natural events such as wildfire, the researchers have access to fireproof vaults of native stone and earth.

Since 1982 PLRWC has been self sufficient in water and electricity. All water is from rain catchment and practical water conservation is practised. A simple but functional solar system provides ongoing power for living and office equipment.

McKelvey and Rismiller (1995) have reported detailed case histories for sustainable utilities of this and other facilities.

Currently there are eleven research focuses being conducted by biologists from Australia and other countries. All researchers are responsible for securing and administering their own funding. A large amount of resource sharing for field equipment and data bases extends the funding capabilities significantly.

Several researchers utilize volunteer assistance as a skilled resource for long term field studies. An active docent program insures that the necessary skills and dedication are given to volunteers before a commitment to a major project is undertaken. Detailed examination of this resource is presented by Rismiller (1994).

Since 1991, research-based exercises have demonstrated the success of economic sustainability directly linked to the sustainability of the natural research area. One research focus utilizes an invaluable human resource provided in part by international organizations such as Earthwatch, Australian Trust for Conservation Volunteers, etc. (Rismiller 1994). Between 1991-1995 international cash flow into the Australian economy from one research focus generated over A$500,000. Joint international-national funding for an Australian-based film company to produce a specialized nature documentary has resulted in the world distribution of the product to 47 countries within six months of completing the project. A successful return rate on the initial investment has enabled the company to move ahead with more educational nature documentaries in an area which traditionally requires financial underwriting.

Maintaining species sustainability and cultural integrity within the natural environment is a major challenge for the human animal. The Pelican Lagoon Research and Wildlife Centre is an example of human cooperation with the environment. It maintains a positive and productive relationship which is not only ongoing but also culturally enriching.

Bibliography

McKelvey M. and Rismiller P. 1995, Designing for Elegant Sufficiency or Superfluous Elegance, Catalyst 95, University of Canberra, ACT

Rismiller P. and McKelvey M. 1994, Echidna Research and the Greater Community, National Conference on Successful Strategies for Ecologically Sustainable Development, Wollongong, NSW

USING AND LOSING IT - THE COMMERCIAL EXPLOITATION OF WILDLIFE IN AUSTRALIA

by Raymond Nias, World Wide Fund for Nature (WWF) Australia

Ray Nias is Director of Conservation for the World Wide Fund for Nature Australia. He has a PhD in Zoology and an ongoing interest in environmental economics and wildlife management. He is also a member of the Commonwealth Endangered Species Advisory Committee.

The commercial exploitation of wild species in Australia has been, until recently, viewed almost solely from economic motives.

Increasingly, however, the commercial use of wild species is being promoted as a means of providing an economic incentive for conservation. This trend parallels world-wide interest in the promoting the commercial, consumptive use of wild species as a tool for biodiversity conservation.

Prompted in part by the view that the conservation of species should be enhanced by commercialisation, most Governments have embarked upon programmes aimed at facilitating and encouraging such enterprises.

The concept has gained increasing acceptance by international development agencies keen on promoting local self sufficiency, and by major conservation organisations keen to make linkages between development and the environment.

The consumptive use of wildlife is inevitable for the foreseeable future. The goal of WWF Australia is to ensure that such use approaches ecological sustainability, and wherever possible, that such use provides **a net conservation benefit for the species concerned in its natural state**.

It is difficult, however, to find **unequivocal** examples that demonstrate the sustainability of consumptive wildlife use. It is even rarer to find examples that demonstrate a clear benefit to the conservation of the species in its natural state.

Many commentators have suggested that as far as wildlife conservation is concerned we must accept that it must either be used for economic gain, or be lost - the "use it or lose it" concept. WWF Australia is concerned about the simplistic

view portrayed by this position and seeks to promote a more conservation oriented approach to the management of wild species.

In general the consumptive use of wildlife falls into one of three categories:

1. Industrial or large scale use of wildlife and wildlife products

Such uses tend to be traditional sources of economic development that have gradually become mechanised since the industrial revolution.

The use is integrated into the mainstream economy and usually has a history of research, regulation and product specialisation over many years. Examples of such use include large-scale fisheries, forestry, and the grazing of native pastures.

It is interesting to note that almost all of these industries have at one time shown evidence of over-exploitation leading to massive industry restructuring or protectionism.

2. Small-scale, semi-traditional and opportunistic consumption

Such uses of wildlife tend to be localised around particular species or ecosystems and generally have not been highly mechanised. They may represent a transition in some cases between subsistence usage and industrial use.

Also included are "opportunistic" uses such as harvesting of species in unusual abundance, recreational hunting, and cottage industries such as the extraction of natural oils from ti-trees.

Such uses have generally not been well documented or regulated, with little research on environmental impact apparent (a possible exception is the kangaroo harvesting industry).

It is clear that a number of such uses provide localised economic benefits and may provide incentives for conservation, at least at the local level.

3. Subsistence and non-commercial use

Many species are utilised by traditional societies and indigenous people, although documentation of such uses has been relatively scant until recently.

Few studies exist that demonstrate the sustainability of such use. However those that do, often show the importance of cultural taboos and tradition in regulating use, low human population size relative to the resource, and absence of external economic influences.

Wild species contribute substantially to the food requirements of many millions of people in developing countries. In at least 18 countries more than half of the daily consumption of animal protein is obtained from wild species.

The economic debate

The basis of the current debate regarding the commercial use of wildlife as a mechanism for conservation is based on the following propositions:

1. revenue generated from the commercial use of wild species will provide an economic incentive for sustainable management of the resource; and

2. that economic incentives arising from commercial wildlife use will have flow-on benefits for biological diversity conservation.

In a variation of the above it is also argued that the sale of products derived from species harvested for other reasons (e.g. because of their pest status) provides a compensatory benefit that enables managers to take a more conservationist approach in their management regimes.

In its more extreme form, advocates of free market solutions promote the transfer of property rights from the state to the individual (Chisholm and Moran 1993). This is intended to avoid the problem associated with common property resources.

Some of the propositions advanced have been derived primarily from a theoretical economic viewpoint with very little understanding of the biology of the systems or species concerned.

Does economic valuation of wildlife lead to conservation?

It is generally agreed that resources which are undervalued are readily exploited beyond their capacity to recover. Conversely, resources that are properly valued are more likely to be conserved.

A problem therefore arises when markets do not reflect the true value of the goods and services provided. This can theoretically be corrected by market intervention although such interventions have been notoriously difficult to apply.

There are numerous examples of where markets have been unable to accurately incorporate economic values of biodiversity, let alone other values. Forests may be of greater value as sources of non-timber products (food, shelter, medicines) or for environmental services (watershed protection, fish nurseries in mangroves), than they are of timber. Despite this, few forests are managed for non-timber products and these values are rarely accounted for in land-use decisions.

Various methods of estimating the total economic worth of species - ranging from direct consumptive value to existence value have been discussed and applied.

In addition to the tangible values, wildlife has other values of equal or greater value to society.

Social and cultural values are often strongly associated with wild species, and the value of species to the functioning of ecosystems and the biosphere at large are only just beginning to be understood.

When items with unique or abstract values (such as the survival of a species or a wilderness area, or human or animal rights) are involved, considerable inadequacies of the pure economic approach become obvious. These intangible values can rarely be converted to a monetary value and are simply not considered. Markets therefore fail to capture the full value of the commodity being traded.

Such considerations have direct relevance to the valuation of biological diversity. Even when an economic incentive to conserve should be clearly evident, as in the case of forestry or fisheries, massive over-exploitation and habitat destruction can occur as a result of market failure.

Furthermore, when species are used to supply private goods, the benefits tend to fall disproportionately to those directly involved, while society at large bears the cost of any social or environmental losses.

Case studies in exploitation

Particular problems with commercial exploitation become evident with long-lived species, slow maturing, low fecundity and migratory species. Such species have rarely, if ever, been harvested on a long-term sustainable basis.

Put simply, the rate of return obtained from sustainable harvesting of such species is too low to compete with other economic alternatives. The maximum economic benefit can be derived from a rapid liquidation of the stock and conversion of the resultant capital into other income generating ventures.

The most obvious species that fit this description are the baleen whales. Long-lived and with a low fecundity the great whales have been pursued relentlessly to the point of near extinction.

As with species such as elephants, tuna, tropical hardwoods, rhinos, turtles and others, the most economic gain would probably be made by selling as many of them as quickly as possible and investing the cash into some more profitable venture.

In summary, it is difficult to see how markets can value species in a manner that necessarily leads to an incentive to conserve the resource. Wild species have numerous values that cannot be dealt with adequately by free markets.

The inherent difficulty of relying on economic valuations and market mechanisms, together with the experience of past and current failures, pose serious doubts about the efficacy of commercial use as a mechanism for conservation of wild species in the Australian context.

Therefore, we believe that the commercial use of wild species does not necessarily result in an any incentive to conserve that species.

Can commercial exploitation help conserve species ?

Well if commercial exploitation does not automatically lead to conservation, can it at least help conservation? Here the answer is much less clear. With few examples having been studied in any depth from both the conservation and economic viewpoint, it is difficult to come to firm conclusions. However, there are a number of reasons to be cautious as well as optimistic.

There does appear to be a limited set of circumstances in which commercial activities provide benefit for both wild species and biodiversity in general.

The key feature of these circumstances appears to be those cases where an economic gain associated with commercial use is sufficient to override competing interests.

The most obvious case is provided by nature-based tourism. Where the value of a site or set of species is sufficient, this may outweigh competing demands for the land from other commercial ventures.

It is not clear whether consumptive use could also provide such an incentive, although attempts are being made in several parts of the world.

Commercial game ranching in southern Africa provides one such example. Proponents of commercial wildlife use in Australia have made much of these limited successes in Zimbabwe. However, even the apparent success of the Zimbabwe model has been questioned (Caughley 1993).

Such approaches are still experimental and it is unclear whether such ventures could remain economically or ecologically viable over the long term without continuous intervention and/or subsidies. Similarly it is not clear what the longer term implications of semi-domestication would be on the species themselves or the habitat. Artificial selection of the stock, pressures to improve pastures, provide reliable water supplies, remove predators and competitors would begin to erode the benefits for the natural environment from such schemes.

A similar problem is the intensification of any use that commonly occurs as the species becomes more closely managed. Any benefit derived from harvesting species in the wild may eventually be lost as ranching and farming take over.

Despite these limitations, the commercial exploitation of free-ranging wildlife appears to offer some potential as a means of overcoming some of the negative economic incentives associated with the retention of wild species in their natural habitat.

In each of these cases, the prime motivation for such schemes seems to be an attempt to counter-balance economic incentives to degrade natural habitats. Webb and Manolis (1993), for example, in their discussion of the Northern Territory crocodile industry suggest that commercial use of wildlife is best viewed as "a

technical tool that the wildlife manager may be able to use to solve particular problems" and that wildlife use programs should be a means to "achieve an established conservation goal".

Even in these more limited examples of commercial use, designed to alleviate problems associated with wildlife or other natural resources management, the results are equivocal.

For example, it is often argued that by granting property owners the right to sell access to wildlife resources that occur on their properties, these property owners will, in turn, take measures to ensure the conservation of the species concerned. A study of hunting in Utah, Jordan and Workman (1989) found that less than 25% of landowners receiving hunting fees improved wildlife habitat or took an active interest in wildlife on their property. Similar conclusions were reached in other studies (see references in Rasker et al. 1992). This has important implications in Australia as one of the most forceful arguments put forward by the proponents of commercial wildlife use is that landowners will retain natural habitat on their property as a result of receiving license fees.

In summary, a limited number of cases appear to demonstrate that a net conservation benefit can be derived from the consumptive use of wild species. Of particular interest are the potential benefits to be derived from careful application of wildlife use schemes as a means for solving other wildlife conservation problems, such as the management of pest species.

The potential for over-exploitation is likely to vary depending on the scale of the use and the nature of cultural, economic, and legal controls.

An important consideration is the extent to which the commercial use is profitable without subsidy or modification of the environment. Additional research is urgently required to determine the economic and ecological viability of existing and proposed wildlife use schemes.

Conclusion

If managed properly, and with due consideration for associated environmental and social impacts, wildlife utilisation (including direct commercial harvesting) may prove to be an important mechanism in achieving the conservation of the natural environment, the ecologically sustainable development of local peoples and their economy.

There appears to be some evidence that, when applied as a specific management tool in response to "problem" wildlife, or as an alternative to more environmentally destructive options, commercial harvesting can assist in the achievement of biological diversity conservation goals.

There is substantial evidence, however, that much of the current exploitation of wildlife for commercial purposes is not ecologically sustainable. In particular, wildlife harvesting conducted solely as an economic enterprise with no conservation objective, has rarely provided conservation benefits.

Suggestions that new species or markets should be developed for commercial use should therefore be treated with caution until a robust regulatory and economic framework can be devised to prevent over-exploitation.

To be accepted as a legitimate mechanism for the conservation of biological diversity, commercial exploitation of wildlife should be able to meet a variety of scientific, economic and ecological criteria, consistent with the principles of Ecologically Sustainable Development.

The use of living organisms for economic purposes needs to meet socially acceptable criteria, and the economic benefits of such exploitation must be equitably distributed within the relevant community or society.

Criteria for ecologically sustainable use of wildlife in Australia have yet to be established and there is a noticeable lack of public policy that deals with this issue in Australia.

WWF Australia suggests that until an ecologically sustainable framework for commercial wildlife use is developed, the commercial exploitation of wildlife should only be supported where **a net conservation advantage to the species and its habitat can be demonstrated.** Until then **Australia will continue to use its wildlife, and lose it.**

References

Chisholm, A.G. and Moran, A.J. 1993 The price of preservation. The Right Hand Corporate Communications in association with The Tasman Institute.

Caughley. G., 1993. Elephants and economics. Conservation Biology **7(4):** 943-45.

Jordan, L. A. and Workman, J. P. 1989. Economics and management of fee hunting for deer and elk in Utah. Wildlife Society Bulletin **17:** 482-487.

Rasker, R., Martin, M. V. and Johnson, R. L. 1992. Economics: Theory versus practice in wildlife management. Conservation Biology **6(3)**: 338-349.

Webb, G. J. W. and Manolis, S. C. 1993. Viewpoint: Conserving Australia's crocodiles through commercial incentives. In Lunney, D. and Ayers, D. (eds) Herpetology in Australia: A Diverse Discipline. Trans. Roy. Zool. Soc. N.S.W. pp 250-256.

SANCTUARIES AND ZOOS: THE ECONOMIC BENEFITS OF THEIR NON-CONSUMPTIVE WILDLIFE USE

by David Butcher, Director,
World Wide Fund for Nature (Australia)

Dr David Butcher is the Director of the World Wide Fund for Nature (Australia) and an Executive Councillor of the Nature Conservation Council, representing the Royal Zoological Society of NSW. He is also a practising veterinarian, and was recently Executive Director of the Royal Society for the Prevention of Cruelty to Animals, NSW.

Introduction

In an economic sense, wildlife is viewed little differently today to that which we can attribute to our hunter gatherer forebears; " the bush buck that runs, the fish that swims, the bird that soars, they are all creatures of the Gods, wildlife has no value to us until it is dead at our feet in the dust."

But things are changing, there is a growing realisation that there is value in wildlife that is not harvested, that there is in fact, value in non-consumptive use. This probably stems in part from an appreciation that our attempts at sustainable utilisation have shown pretty dismal results to date.

Returns from non-consumptive uses of wildlife are in many cases intangible and are based upon aesthetics, human imagination and just knowing that they are there. Possibly it is some primordial need that we address, especially for those of us who live in cities when we feel the need to change our surroundings, to fill it with plants and animals. The breathtaking pleasure, release and inner peace that we all seem to experience when coming close to nature is probably innate. Eco-tourism, the most economically productive non-consumptive use of wildlife, certainly capitalises fully upon these feelings.

But what of zoos and sanctuaries:

- do they use wildlife non-consumptively?
- do they produce economic benefits, and are these benefits directed at producing positive effects for wildlife?

- do they produce intangible but equally valuable conservation benefits?
- are zoos today a legitimate part of the conservation effort?

These are the questions that this paper will endeavour to address.

What is a Sanctuary or Zoo?

In this context a zoo or sanctuary can be defined as a major zoological institution which can be easily visited by the community, it may be operated privately or by a government instrumentality. It will be dedicated to the presentation of a cross-section of the animal kingdom in a way which will provide a stimulating and knowledge-building experience for its visitors. It will probably have a modest biological research capacity and be dedicated to wildlife conservation. The staff will be well trained, the animals will be maintained in environments replicating those in which they are found naturally and the standards of animal management and welfare will be excellent. The animal collection will have nominal value, will mainly be captive bred and in the case of threatened or endangered species, animals will form part of a collective inter-zoo breeding programme.

Within Australia the percentage of establishments that fit these criteria should be growing rapidly, driven by community expectations together with new legislation such as the NSW Exhibited Animals Protection Act.

Unfortunately, many of the so called zoos and fauna parks that we see overseas will certainly not match the above definition.

The International Trade in Living Wildlife

There is little doubt that there is an enormous and growing, licit and illicit trade in live animals either for private collectors or zoological institutions. The rarest, the most unusual, the most exotic are all highly sought after. The seemingly outrageous prices that are paid attract the poacher, the smuggler, the profiteer and the corrupt, none of whom care one iota about further compromise to disappearing species and their habitats. The methods of collection of specimens can be extremely destructive and the survival percentage of those collected can be abysmally low. The wild bird trade and "cyanide" fishing for coral reef species are examples. This must be the most ugly side of wildlife exploitation and it is driven in many cases by zoos and the zoologically misguided.

To our great shame Australia is a major part of this traffic. Native species disappear overseas with no thought to the effect; and exotic species are smuggled in, not only risking conservation in the country of origin but also native and domestic species within Australia, through the introduction of disease or the establishment of wild populations. The regularity of customs confiscations and the sudden appearance of previously unrecorded species in Australia give cause for grave concern.

Zoos as a Conservation Tool

That Australia and its zoos were part of legal but non-sustainable consumption of wildlife for zoological specimens in the past is not in doubt. The more enlightened modern views that institutions fitting our definition would have, does however, distance them from those excesses.

The previous tendencies of zoos to seek out the rare and disappearing, has meant that several species which have subsequently disappeared from the wild are still with us today. While the initial motives may not have been those of species survival, the result has been just as successful. Pere David's deer and the Przewalski horse are probably the best known examples.

Subsequently, species that were obviously in trouble were targeted for removal from the wild with the objective of providing a safe haven and the possibility of future release back into the wild when suitable habitat again became available. The Arabian oryx, the nene goose and Arabian sand gazelle are good examples. The process is however, anything but simple (genetic drift and changes in social order), is inordinately expensive and success is not possible for all species (peak carnivores such as the tiger for example).

A number of species in Australia will however fit this style of management and their ultimate survival may depend upon the development of successful captive management and reintroduction strategies. The western swamp tortoise, bilby, numbat, chuditch and orange bellied parrot are good examples.

Probably, and more importantly, it is the management tricks that are learnt during the process of captive management that may allow some of the threatening processes found in the wild to be removed, or at least modified, thus leading to a net conservation benefit.

Wildlife diseases, their management and control, feeding strategies and artificial substitutes, habitat requirements and their replication in the wild, or just the provision of alternatives: these are just some examples of the captive management experience which may provide, together with smart thinking, the survival leap which many of our species will need to remain part of Australia's living heritage.

The recent commercialisation of the fenced sanctuary for wild life conservation must be viewed as one, only, of the tools needed to ensure species survival. Their commercial success is usually predicated upon an associated eco-tourism component. The inherent problems and costs associated with maintaining exclusion of foxes and cats in even small areas, limits the usefulness of the model. However, low cost exclosures will no doubt be an essential part of future reintroductions of some species to former rehabilitated habitats.

Awareness and Understanding

This is the area where zoos have the chance to excel. An area where much of the non-consumptive "capital" needed for Australian wildlife can be generated.

That there is a rapidly growing awareness of our wildlife both within Australia and overseas is not in any doubt. The last 20-30 years has seen our interest and knowledge grow at an enormous pace. Video, film, books, magazines and the media generally have all played their part. But the continuing community interest, especially amongst children, in our modern Australian zoos demonstrates the role and also the untapped potential that these institutions provide. The fact that animals, which are not the most highly charismatic, have incredibly interesting stories to tell, that the web of life is complex, poorly understood and unbelievably fascinating are just some examples of the facts that zoos are in an absolutely ideal position to promote.

To take their place within the conservation equation zoos must stick to their "knitting". It is possibly unrealistic for any zoo to promote themselves as the peak conservation organisation in any region. That they are a part of the process is not in doubt and must be recognised by all sides with encouragement of better focus upon their strengths.

These strengths include:

- Communication within the community, in terms that are widely understood, about biology, conservation and the environment. The emphasis must be upon the natural props that zoos have available - their living animals.

- Captive management and husbandry - definition of those conditions under which captive animals thrive and how this knowledge may benefit wild populations.

- Veterinary management with emphasis on epidemiology, pathogenesis and the control of disease.

- The ability to build upon the knowledge base through serendipitous research.

- The ability to closely co-operate with national conservation efforts.

Conclusions

In conclusion it can be seen that zoos have had a chequered past and were anything but non-consumptive users of wildlife. Unfortunately, even today many overseas zoos and a plethora of live animal "collectors" including Australians are placing such heavy pressure upon wildlife and their support systems that they can be seen to be compromising the likely survival of many species.

However, those zoos and sanctuaries which fit the definition provided above have a huge untapped potential to provide considerable returns to our community through the non-consumptive use of wildlife. While this return can be measured in part as an economic entity through a whole suite of income generating programmes, the most valuable pay-off to Australia's natural systems will be through:

- greater understanding by the general community;

- considered transfer of expertise from the captive management experience to recovery programmes in the wild; and

- the considered and sensitive presentation of animals in captivity that will underwrite the value of their relatives in the wild. This is probably the most important form of return that we will receive.

THE ETHICS OF COMMERCIALISING WILD ANIMALS

by Professor Peter Singer,
President,
Australian & New Zealand Federation of Animal Societies (ANZFAS)

Peter Singer is an internationally respected author and ethicist, renowned for his work in the field of animal rights. His pioneering book "Animal Liberation", published in 1975, quickly became the manifesto of the Animal Liberation movement. Other books he has written include "Practical Ethics", "How Are We to Live?" and "Rethinking Life and Death". He has also been active in Australian politics, having recently headed the Greens Senate ticket for Victoria at the last Federal election. Professor Singer currently teaches at the Centre for Human Bioethics, at Monash University, Melbourne.

The Western Tradition

When Europeans first came to Australia, they saw our continent's wild animals much as we now see its coal and iron ore: as a resource for the taking. So they shot kangaroos and koalas for their skins, meat, or for sport, slaughtered seals for their fur, harpooned whales for blubber and oil, and even boiled down the penguins of Macquarie Island so that their oil could be used in cosmetics.

The Australian animals that were not exploitable in this way were pests, and better eliminated. So there was a bounty on the head of Tasmania's marsupial "tiger", the thylacine, and grazing kangaroos and wallabies had to make way for more useful animals imported from Europe, like sheep, cattle and even rabbits.

The Europeans who did this to Australia's animals brought with them attitudes to the natural environment that were a legacy of more than two thousand years of Western civilization. These attitudes ruled with very little challenge until the rise of the environmental movement in the 1970s; and it could be argued that they are still the predominant force in decisions about the environment.

Western attitudes to nature grew out of a blend of those of the Hebrew people, as represented in the early books of the Bible, and the philosophy of ancient Greece, particularly that of Aristotle. In contrast to some other ancient traditions, for example those of India, both the Hebrew and the Greek traditions made human

beings the centre of the moral universe; indeed not merely the centre, but very often, the entirety of the morally significant features of this world.

The biblical story of creation makes very clear the Hebrew view of the special place of human beings in the divine plan:

> *And God said, Let us make man in our image, after our likeness: and let them have dominion over the fish of the sea, and over the fowl of the air, and over the earth, and over every creeping thing that creepeth upon the earth.*
>
> *So God created man in his own image, in the image of God created he him; male and female created he them.*
>
> *And God blessed them, and God said upon them, Be fruitful, and multiply, and replenish the earth, and subdue it; and have dominion over the fish of the sea and over the fowl of the air, and over every living thing that moveth upon the earth.* [1]

Today Christians debate the meaning of this grant of "dominion"; and those concerned about the environment claim that it should be regarded not as a license to man to do as he wills with other living things, but rather as a directive to look after them, on God's behalf, and be answerable to God for the way in which they are treated. But given the example God set when he drowned almost every animal on earth in order to punish Noah for his wickedness, it is no wonder that people should think of animals as things for us to use. After the flood there is a repetition of the grant of dominion in more ominous language:

> *And the fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea; into your hands are they delivered.* [2]

The implication is clear: to act in a way that causes fear and dread to everything that moves on the earth is not improper; it is, in fact, in accordance with a God-given decree.

This was the thinking of mainstream Christianity for at least its first eighteen centuries. There were gentler spirits, certainly, like Basil, John Chrysostom and

---

1 *Genesis*, I, 24-28.

2 *Genesis* 9, 1-3.

Francis of Assisi, but for most of Christian history they have had no significant impact on the dominant tradition. It is therefore worth emphasising the major features of this dominant Western tradition, because these features can serve as a point of comparison when we discuss different views of the natural environment.

According to the dominant Western tradition, the natural world exists for the benefit of human beings. God gave human beings dominion over the natural world, and God does not care how we treat it. Human beings are the only morally important members of this world. Nature itself is of no intrinsic value, and the destruction of plants and animals cannot be sinful, unless by this destruction we harm human beings.

Harsh as this tradition is, it does not rule out concern for the preservation of nature, as long as that concern can be related to human well-being. Often, of course, it can be. One could, entirely within the limits of the dominant Western tradition, oppose the mining of uranium on the grounds that nuclear fuel, whether in bombs or power stations, is so hazardous to human life that the uranium is better left in the ground. Similarly, many arguments against pollution, the use of gases harmful to the ozone layer, the burning of fossil fuels, and the destruction of forests, could be couched in terms of the harm to human health and welfare from the pollutants, or the changes to the climate that may occur as a result of the use of fossil fuels and the loss of forest. Since human beings need an environment in which they can thrive, the preservation of such an environment can be a value within a human-centred moral framework.

From the standpoint of a form of civilization based on growing crops and grazing animals, wilderness may seem to be a wasteland, a useless area that needs clearing in order to render it productive and valuable. As for wild animals, they are either dangerous, like wolves in European folklore, or crocodiles and snakes in Australia, or they are pests, because they eat the crops and grasses that we want for our own use. But once we drop the Judeo-Christian view of the world, can these assumptions be defended?

Is There Value Beyond the Human Species?

In any serious exploration of environmental values a central issue will be whether there is anything of intrinsic value beyond human beings. To explore this question we first need to understand the notion of "intrinsic value". Something is of intrinsic value if it is good or desirable *in itself*; the contrast is with "instrumental value", that is value as a means to some other end or purpose. Our

own happiness, for example, is of intrinsic value, at least to most of us, in that we desire it for its own sake. Money, on the other hand, is only of instrumental value to us. We want it because of the things we can buy with it, but if we were marooned on a desert island, we would not want it. (Whereas happiness would be just as important to us on a desert island as anywhere else.)

Now consider the issue of killing wild animals in order to profit from their meat, or skins. Should the decision be made on the basis of human interests alone? Here we find a fundamental moral disagreement: a disagreement about what kinds of beings ought to be considered in our moral deliberations. Many people think that once we reach a disagreement of this kind, argument must cease. As I have already briefly indicated, I am more optimistic about the scope of rational argument in ethics. In ethics, even at a fundamental level, there are arguments that should convince any rational person. Take, as an example, a view held by one of founders of the Western ethical tradition: Aristotle's notorious justification of slavery. Aristotle thought that captured barbarians were "living instruments" - that is, human beings who were not of intrinsic value, but existed in order to serve some higher end. That end was the welfare of their Greek captors or owners. He justified this view by arguing that barbarians were less rational than Greeks, and in the hierarchy of nature, the purpose of the less rational is to serve the more rational.[3]

No one now accepts Aristotle's defence of slavery. We reject it for a variety of reasons. We would reject his assumption that non-Greeks are less rational than Greeks, although given the cultural achievements of the different groups at the time, that was by no means an absurd assumption to make. But more importantly, from the moral point of view, we reject the idea that the less rational exist in order to serve the more rational. Instead we hold that all humans are equal. We regard racism and slavery based on racism as wrong because they fail to give equal consideration to the interests of all human beings. This would be true whatever the level of rationality or civilization of the slave, and therefore Aristotle's appeal to the higher rationality of the Greeks would not have justified the enslavement of non-Greeks, even if it had been true. Members of the "barbarian" tribes can feel pain, as Greeks can; they can be joyful or miserable, as Greeks can; they can suffer from separation from their families and friends, as Greeks can. To brush aside these needs so that Greeks could satisfy much more minor needs of their own was a great wrong and a blot on Greek civilization. This is something that we would expect all reasonable people to accept, as long as they can view the question from

[3] Aristotle, *Politics*,, J.M. Dent and Sons, London, 1916, p.16.

an impartial perspective, and are not improperly influenced by having a personal interest in the continued existence of slavery.

Now let us return to the question of the moral status of nonhuman animals. In keeping with the dominant Western tradition, many people still hold that all the nonhuman natural world has value only or predominantly in so far as it benefits human beings. A powerful objection to the dominant Western tradition turns against this tradition an extended version of the objection just made against Aristotle's justification of slavery. Nonhuman animals are also capable of feeling pain, as humans are; they can certainly be miserable, and perhaps in some cases their lives could also be described as joyful; and members of many mammalian species can suffer from separation from their family group. Is it not therefore a blot on human civilization that we brush aside these needs of nonhuman animals so as to satisfy minor needs of our own?

Pain is pain, and the extent to which it is intrinsically bad depends on factors like its duration and intensity, not on the species of the being who experiences it. Hence there is no justifiable basis for drawing the boundary of value around our own species. To do so is to give preference to the interests of members of one's own species, simply because they are members of one's own species - and this is speciesism, a moral failing that is parallel to racism, because it attempts to put a morally crucial divide in a place that is not justified on any basis other than a preference for "us" over "them". Or to put it another way, if we are prepared to defend practices based on disregarding the interests of members of other species because they are not members of our own group, how are we to object to those who wish to disregard the interests of members of other races because they are also not members of our own group? I shall not here go further into this argument, because I have developed it elsewhere at some length.[4] The argument shows that the dominant Western tradition is untenable, at least in regard to creatures capable of suffering.

Rejecting the dominant Western tradition in this way makes a radical difference to the value basis on which we should consider the commercialisation of wild animals. The entire mindset that lies behind talk of "sustainable use" and "harvesting a resource" is derived from this Western tradition that makes animals merely of instrumental value. It is therefore fundamentally wrong.

[4] *Animal Liberation* (New York Review of Books, New York, 2nd. edition, 1990.)

I have been involved in the animal movement long enough to have participated in the debate about whether Australia should continue to allow whaling. We had, as recently as the 1970s, a shore-based whaling station at Cheynes Beach in Western Australia. I well remember the arguments that took place then, between those opponents of whaling who argued that present catches of whales were driving the southern right whale to extinction, and the defenders of whaling who claimed that the catch taken at Cheynes Beach was less than the "MSY" -"maximum sustainable yield" - and therefore no threat to whale populations. The calculations as to what might be the maximum sustainable yield of the whale population were quite complex, and depended on such things as whether female whales would begin to breed at an earlier age if there were fewer whales, and hence more food to go around the whale population. For me, these arguments were always irrelevant: whales are conscious beings -"mind in the waters" - and to treat them as so much oil and blubber was an obscenity. I think that, as far as whales are concerned, the viewpoint I took has now prevailed, everywhere except perhaps Japan, Norway, Iceland and one or two other nations. We want to protect whales from whaling, even if they are in no danger of extinction, because we do not think of them as resources.

Yet, as the Japanese are found of pointing out, we are surely beiong a bit hypocritical if we, who do not like to eat whales, insist that whales must not be turned into small parcels of meat, while we continue to do just that to our own land-based wild animals. Is this not some kind of cultural imperialism?

The accusation of cultural imperialism is not entirely groundless. We can reject it with a clear conscience only if we insist that Australia's land-based wild animals are not, any more than our marine mammals, things for us to use, like lumps of coal we dig out of the ground, or nuts we gather from trees. To treat animals as resources, and argue about when use is sustainable, is a classic example of economic rationalism running heedlessly over non-economic values. We should no more hand our wild animals over to the tender mercies of the market than we should hand our children over to the same market forces. Neither children nor wild animals are a "product" or a "resource" at all.

In saying this, I am not concerned with the claim that commercialisation may push some species of animals over the brink of extinction. This may be true or it may not be true. In any case, it is a mistake to focus only on whether a wild animal is a member of an endangered species, or whether commercialisation threatens the very existence of the species. This is still the "resource" mentality - it is just the enlightened resource mentality, that wants to make sure that the resource

continues to exist so that it can continue to be exploited. But wild animals are sentient beings, with lives of their own to lead. They do not exist for our benefit, or for us to use.

The argument I have presented does not require us to regard the death of a nonhuman animal as morally equivalent to the death of a human being, since humans are capable of foresight and forward planning in ways that nonhuman animals are not. This is surely relevant to the seriousness of death, which in the case of a human being capable of planning for the future, will thwart these plans, and thus causes a loss that is different in kind from the loss that death causes to beings incapable even of understanding that they exist over time and have a future. It is also entirely legitimate to take into account the greater sense of loss that humans feel when people close to them die; whether nonhuman animals will feel a sense of loss at the death of another animal will depend on the social habits of the species. These differences between causing death to human beings and to nonhuman animals do not mean that the death of a nonhuman animal should be treated as being of no account. On the contrary, death still inflicts a loss on the animal - the loss of all its future existence, and the experiences that that future life would have contained.

What, though, if the future lost to the animal by the death we inflict is likely to be short and filled with suffering? This would be the case, for example, where animals are in an area affected by drought, and are suffering so badly from lack of food, that even if the weather were to break, they could not be expected to survive until new food grew. Then it can properly be argued that the death of the animal is not contrary to its interests. In the case of humans who are dying and in distress, we can ask them if they wish to continue to live; and many Australians believe that if they say no, they should have the option of an easy death. In the debate on voluntary euthanasia, it is often said that we would not force an animal to live through the kind of death we force humans to endure; and I agree that this is perhaps the one respect in which we treat animals better than we currently treat human beings. Since animals cannot be consulted about their fate, we are justified in acting paternalistically on their behalf, where their future prospects are so grim. This is merely an application of the principle of equal consideration for their interests, in those tragic situations where they may have a greater interest in dying swiftly than in continuing to live only in order to die more slowly.

If we do have to kill animals for reasons that are ethical because they are based on the interests of the animals themselves, and it is possible to make a profit by selling parts of their bodies, may we ethically do that? In theory, it is hard to find a

strong objection to doing so. It does not make a difference to the dead animal. It may remove bodies from the eco-system that ought to have remained part of it, but this will often be a very minor infringement of good ecological practice, compared to other things that we do. So in itself, there seems little to object about it.

Unfortunately, human motivation being what it is, in practice allowing the commercialisation of any wild animal will have various undesirable effects. It will increase the pressure to find circumstances of "justifiable euthanasia", and make us less than impartial judges on when it is an animal's interests to die. It will create a market for a product that can only be obtained from wild animals, and may make illegal killing more difficult to detect and prevent. Finally, it is likely to lead to a different attitude to wild animals, one that sees them through a mist of dollar signs. Commercialisation sees sentient beings as things, and asks how we can best profit from them. An ethical attitude sees wild animals as sentient beings, and asks how we can best protect and preserve their interests, while recognising that our own interests must also count, especially where our own survival is at stake.

Markets and Values

Some years ago, the British sociologist R.M. Titmuss wrote a book called *The Gift Relationship*. The core of the book was a comparison of two different methods of obtaining blood for medical purposes. One method, which Titmuss studied in Britain, but is also the method we use here in Australia, is that of voluntary donation, for no reward other than an indifferent cup of tea, through a Red Cross blood bank, to a stranger in need. The other method, then prevalent in the United States, was the method of the market. In the market system, blood has a price and can be bought and sold like any other product.

According to the economic rationalists who subscribe to the ideology of the free market, if people want to buy and sell blood, they should be free to do so. They are not interfering with the freedom of anyone else who prefers to go to the Red Cross and donate their blood. But Titmuss showed that the situation was not so simple. It was precisely because, in the British system, blood had no market price, that people were prepared to come forward and donate their own blood to strangers. If it could be bought and sold like any other commodity, the incentive to this special kind of altruism falls away. Moreover, Titmuss suggested, it is altruistic institutions like the national blood service that enable strangers to relate to other strangers, and so help to bind communities together. Although it cannot be

proven, it seemed to Titmuss that the dramatically differing rates of crime in British and American cities might have some connection with the fact that in Britain there was still scope for forms of altruism that, in the more market oriented America, had virtually ceased to exist.

What does this have to do with the commercialisation of wildlife? I mention *The Gift Relationship* only in order to show that there are some things that the market cannot value properly. To justify the destruction of an ancient forest on the grounds that it will earn us substantial export income fails to take into account the value of that forest as a link with the past that, once felled, can never be replaced. Similarly, commercialisation turns wild animals into a product, with a market price. It changes their population dynamics, thus changing the physical nature of the animals themselves. For example, selective pressure on the larger kangaroos will lead to a pattern of evolution that favours smaller kangaroos. Even if this does not happen, the way we think about kangaroos has to be different when they end up neatly sliced and packaged in supermarkets, than when we see them only living freely in their natural habitat. Economic growth based on the exploitation of living sentient creatures can be seen as something that brings gains to the present generation, and possibly the next generation or two, but at a price that will be paid by every generation to come.

Conclusion

I began by talking about the era of exploitation of Australia's wild animals that began with European settlement. This era of exploitation is not over yet. We are more concerned about endangered animals than we were a generation or two ago, but when animals are relatively abundant we still regard them as a resource. That is how the kangaroo, Australia's national symbol, is still being treated. Each year, about four million of these animals are killed by professional shooters, who sell the bodies so that their skins can be used to make the leather that goes into athletic shoes, their fur can decorate homes and cars, and their meat can be fed to pets, or to those who dine out and want a new taste for their jaded palates.

To drive a species into extinction is a crime against the ecology of our planet, and against all who will come after us, inheriting a world that has lost something irreplaceable. The same is true of the destruction of wild places, and the loss of entire ecological systems. It is also true of the death and suffering we inflict on individual animals. The fundamental problem is one of attitude: is this planet and all its nonhuman inhabitants to be regarded as the rightful possession of those humans who presently live on it? Can it be ethically acceptable that forests that

have existed for thousands of years and are home to creatures of many kinds should be felled to raise the living of one generation of human beings? Are sentient creatures, whether rare or plentiful, a resource for us to use as best suits us? Or do they have interests of their own, that we should respect?

We have only to ask such questions to see what the answer should be. At least since Darwin, we have known that the forests and animals were not placed on earth for us to use. They have evolved alongside us. Once felled, the virgin forests can never be restored. The animals we kill for their skins or for pet food have similar nervous systems to our own, and can presumably feel pain, or enjoy life, as we do. Why should the fact that they are not members of our species entitle us to disregard their interests? The interests of other animals may be different from our own, but that is no justification for failing to give them the same consideration that we give to similar interests of human beings.

When I think about how obvious this is, I am staggered that anyone could really think that the meagre amount of oil obtainable from a penguin could justify seizing these birds and boiling them down. Yet when we remember that the attitude of the first European settlers to the aboriginal inhabitants of our continent was little better than it was to the animals they so ruthlessly slaughtered, it is not so surprising that many of us still do not question what we are doing to Australia's wildlife. Human beings seem to find little difficulty in classifying those different from themselves as an "other", and putting those "others" outside the circle of morality, whether the difference is one of race or species.

One day Australians will look back on what we are doing to wildlife in horror, as we now look back at what the first Europeans to land in Australia did to the aboriginal people who were living here. We need a Mabo decision for Australia's wild animals - a legal recognition of their special status as original residents of Australia, alongside its original human inhabitants. The only ethical approach to Australia's wild animals is one that gives their interests equal consideration alongside human interests.

APPENDIX 1

Nature Conservation Council of NSW Resolution on the Commercialisation and Consumptive Use of Wildlife

This resolution was submitted by the Nature Conservation Council of NSW to the World Conservation Conference, convened by the International Union for the Conservation of Nature (IUCN), held at Montreal, Canada, in October 1996:

"Commercialisation and Consumptive Use of Wildlife

RECOGNIZING that the Mission Statement of IUCN - The World Conservation Union commits the Union to ensuring the ecological sustainability of any use of natural resources;

RECOGNIZING the increasing importance that the international community places on ensuring that any use of natural resources should be ecologically sustainable;

ACKNOWLEDGING the previous Recommendations on the use of wildlife such as 19.54 on Sustainability of Non-Consumptive and Consumptive Uses of Wild Species;

ACKNOWLEDGING that many people in both industrial and non-industrial societies believe that the killing of wild fauna is ethically unacceptable;

RECOGNIZING the rights of indigenous people to maintain their traditional practices and lifestyles;

ACKNOWLEDGING that any such use by indigenous people that is likely to lead to the extinction of a species should be reviewed with a view to removing such a threat;

NOTING that the objective powers of external market forces can prevail over cultural values and political will;

NOTING that scientific knowledge and understanding of the interactive and synergistic effects of the exploitation of wildlife on biodiversity and ecological integrity is limited to such a degree that the precautionary principle should prevail;

1. *CALLS upon all governments to:*

(a) refrain from legislating or otherwise enabling the commercialization and consumptive use of certain types of wild fauna (mammals, avifauna, reptiles and amphibians);

(b) in the case of flora and other species of fauna, only permit commercialisation and consumptive use of wild flora and fauna following -

(i) a full and independent scientific assessment of the implications of such exploitation for the conservation of biodiversity and ecological integrity;

(ii) which has been subject to formal public assessment and comment; and

(iii) whereby any such subsequent commercialised consumptive use of wild flora would be subject to regular publicly audited monitoring and review processes; and

(c) where the above policy affects the practices and traditional lifestyles of indigenous people, it would be desirable that consumption patterns should reflect traditional values rather than meeting the demands of external market forces.

2. *REQUESTS THE DIRECTOR to promote the development of appropriate wildlife management strategies to support the implementation of the above policy."*

APPENDIX 2

WWF World Wide Fund
For Nature Australia
ACN 001 594 074

Level 10
8-12 Bridge Street, Sydn
NSW 2000 Australia
GPO Box 528 Sydney
NSW 2001 Australia
Telephone: (02) 247 6300
Fax: (02) 247 8778

17 January 1996

Dr Bill Freeland
Head, Wildlife Division
NT Parks and Wildlife Commission
PO Box 496
Darwin NT 0831

Dear Dr Freeland, Bill

Crocodile management

Following our meeting at the NCC 'Sustainable Use of Wildlife Seminar' in Sydney last September, I am writing to seek your assistance.

In questions after my presentation you challenged the accuracy of a number of my comments. Naturally, if there is evidence that I am unaware of, I am anxious to ensure that any errors or omissions are corrected. In particular:

Government assistance to industry

In the not too distant past it is clear that the industry was subsidised. For instance:

* A draft 1985 cabinet submission lists one of six benefits of a crocodile industry as *"the existing public investment by the NT Government can be secured and recovered"*.

* The 1992 "Northern Territory Crocodile Industry Strategy" comments that government "*expenditure in 1991/92 on the crocodile management program is approximately $1 million* [and cites $10 million over 15 years] *with about 40% recovered directly from the industry. Without such a financial commitment from the NT Government there would be no industry.*"

Can you provide me with detailed figures on the current NT program, specifically how much does the NT currently (in the last two financial years):

* spend on 'public good' crocodile management;
* spend on ecological as opposed to ranching related research;
* spend on crocodile industry related activities;
* receive directly from the industry in fees for service.

Conservation of habitat

As the industry often claims that wildlife use has lead to the reservation of habitat, could please detail which areas of the NT have been conserved for crocodiles by the industry's establishment?

The reservation of 23 sq. km (2,300 ha) at Melacca Swamp has been cited as an outcome of the industry's development. Can you inform us:

* when Melacca Swamp was reserved;
* what legal status the reserve has;
* what uses are permitted and what uses are currently made of the reserve.

My count of coastal wetlands in the NT from the 'Directory of Important Wetlands in Australia', excluding those formally reserved in their entirety, is an area of 1,093,750 ha (considering middle reaches of the Daly River as 1,650 ha and excluding Gurig NP (84,000 ha) and Kakadu NP (217,450 ha)). When do you expect more than Melacca Swamp's 2,300 ha to be reserved or protected by agreement through the activities of the crocodile industry?

Population structure

In the crocodile debate, the NT Government has often cited the dangers of a growing crocodile population as a reason to reintroduce wild harvesting. I note in the Commission's December 1995 "Background information relevant to the Management of Crocodiles in the Northern Territory" (pg. 4) that:

> *"There is compelling evidence ... that the most significant constraint on* C. porosus *population expansion is density-dependent mortality; larger crocodiles eating smaller ones, or displacing them into sub-optimal environments."*

If an age structure with more old crocodiles limits population growth, and your Government is concerned at a growing crocodile population, why does your agency favour expanded wild harvesting?

Loss of stock

In recent publications the NT has claimed that loss of stock to crocodiles is a reason for expanding wild harvesting operations.

Would you agree that good pastoral practices would see livestock substantially fenced out of river banks and waterholes, where they damage soil and vegetation?

How may pastoral leases do you believe to be affected by crocodiles taking stock?

Research

In CITES monitoring reports for 1991 and 1992 the only crocodile research reported was a population monitoring program. What crocodile research is the Commission currently sponsoring?

Public recognition

In your Commission's December 1995 management program, the Commission repeated the claim that your program "enhanced the value of crocodile conservation in the eyes of the community'. I would appreciate a copy of the surveys used to substantiate these comments.

I look forward to your assistance, which would greatly inform our participation in the wildlife use debate.

Yours sincerely,

Jamie Pittock
Conservation Officer.

cc.
Mr Michael Vardon
Environment Centre NT
NSW Nature Conservation Council
ANCA

NB: Please note new street address and contact numbers for our Sydney office (our postal address remains unchanged):

WWF Australia
1/71 York Street
Sydney NSW 2000
AUSTRALIA

Phone: +61 2 299 6366
Fax: +61 2 299 6656

Crocs.

PARKS AND WILDLIFE COMMISSION OF THE NORTHERN TERRITORY

PO Box 496 Palmerston
NT 0831 Australia
1st Floor Gaymark Building
Telephone: 61 089 99 4401
Facsimile: 61 089 99 4524

Our Ref:

Director
World Wide Fund for Nature Australia
GPO Box 528
SYDNEY NSW 2001
ATTENTION: Mr Jamie Pittock
Conservation Officer

Dear Director

Thank you for your letter of the 17 January 1996 requesting information on crocodile and wetlands conservation in the Top End. The WWF's can be justifiably proud of its international role in the promoting and establishing projects related to the sustainable use of wildlife. Conservation will benefit from WWF increasing its interest in such projects within Australia.

I am unable to meet your request re details of the budget allocated to crocodiles. Significant components of the crocodile program are subject to private contract, and hence it is inappropriate to reveal them in public. None the less the questions you raise seem related to the nature of the expenditure, rather than necessarily requiring comment on the quantities of funds involved in each particular case.

It is sufficient to note that total expenditure is significantly lower than your quote from 1992. None of the Commission's expenditure is allocated to support the crocodile industry. Indeed the reverse is often the case. For example, all egg collections conducted by the industry are conducted at industry expense, and require the return of information on nesting area, size, and location as well as eggs collected. These data are critical to monitoring of the population, and good management of crocodile habitat. The Commission's expenditure on crocodiles would be significantly larger if these costs were not met by industry.

The easiest way to respond to your questions is to use your headings to provide you with an update on progress.

Government assistance to industry

Expenditure on "public good" management: Removal of problem crocodiles from Darwin Harbour is conducted under a contract to the Parks and Wildlife Commission. In addition to this, Commission staff remove problem animals from other areas; including the Darwin rural area, Adelaide-Mary River wetlands, Gove, Alyangula, and the Daly, Katherine, Victoria, Roper and McArthur Rivers. These latter activities are confined to identified problem animals, usually in areas of high public use. It is hoped that the cost of problem animals can be reduced with the revised listing of the saltwater crocodile under CITES, and with approval of the new management program. These activities would be required whether or not there was commercial

use of crocodiles, and so I have included them as "public good". It seems likely that costs to the Commission would be significantly higher and the activity more extensive in the absence of the annual take, and without positive public perception of the management program.

Expenditure on ecological and ranching research: The Commission is not involved in any research on the ranching/farming of crocodiles. All the ranching/farming research I know of is conducted by the farms, with some advice from the Department of Primary Industry and Fisheries (see below).

By far the largest portion of the research program is devoted to monitoring. Monitoring is regarded as the most important part of the crocodile program. Projects over the coming three years are: (i) continuation of the monitoring program; (ii) review of the monitoring program (scheduled for this and next year); (iii) implementation of, as appropriate, a new and improved monitoring program; (iv) development of a sustainable harvest of large crocodiles at the request of Aboriginal traditional owners (following approval of the draft management program); and (v), a complete review of the biology, history and current status of the Top End's saltwater crocodile population. I believe that the steps involving monitoring, and review of the population (the vast majority of the projected research expenditure) would be a basic requirement of good conservation management whether or not there was commercial use of crocodiles. Even the proposed trial harvest relates directly to the management of problem animals (see below).

Expenditure on the crocodile industry: Expenditure related to the industry is restricted to reporting on farms as required under the management program, and provision of basic veterinary services (similar to those provided to other livestock industries). These roles are undertaken by the Department of Primary Industry and Fisheries, and expenditure is primarily related to salaries for people needed to monitor farms i.e. the majority of the cost is directly related to "public good" as a consequence of the requirement for public reporting on the farms (i.e. which differs from the situation with other livestock industries).

There is no government expenditure related to harvests of eggs etc.

Fees for service: A charge is made to recover costs on the capture of problem animals. Fees vary according to the size of crocodiles, varying from $75 up to over $1,000. In 1995 a total of 197 problem animals were removed from the Darwin area, with an additional 29 captured by Katherine based staff.

It is important to note that no royalty is charged for eggs or hatchlings. The opportunity for revenue is foregone in favour of landholders being able to gain monetary return from eggs laid on their lands. Industry pays landholders $5 per egg or $10 per hatchling. In some cases the Commission is the management agency that receives payment for eggs. Returns from Melacca Swamp more than meet the management costs of the area.

Conservation of habitat

I note that you have used the directory of important wetlands as a basis for looking at reservation status in the Top End. Given that crocodiles and other wetland biological diversity require wetlands well beyond those listed in the directory, I hope you will approve of my dealing with the entire wetlands reservation situation, regardless of what is or is not included in the directory. As part of the Commission's efforts to determine the adequacy, representativeness etc of its reserves, an assessment has been made re the situation with wetland communities. At the moment approximately 2,572 km^2 of coastal wetlands is reserved. This includes mangroves,

seasonal floodplains and *Melaleuca* open forest, and amounts to 21% of such habitats in the Top End. All these are crocodile habitats. I think you will agree that on a national or international scale this level of wetland reservation is an outstanding achievement. Melacca Swamp was set aside on 25 March 1986 . It is not open to the public and its only use is for crocodile nesting. Eggs are collected and detailed records kept. There have been other significant reservations of wetland habitats, particularly in the Mary and Adelaide River areas. Of particular note has been reservation of the McKinlay River population of freshwater crocodiles. Actions are under way to provide for either reservation or formal management of an outstanding nesting habitat for saltwater crocodiles in the Victoria River area.
While no formal, quantitative assessment has been made of how landholders actions may be influenced by the returns they receive from eggs, the Commission is confident that landholders who gain income from crocodiles will provide security for habitats of crocodiles. The Commission would be interested in the WWF supporting such a survey. The projected cost is approximately $35,000. The project has a low priority unless an external sponsor can be found. Your consideration re WWF funding the project would be appreciated.

The Commission's confidence that economic returns to landholders provides an incentive comes from two sources. One is the scale of the monetary return. Income to traditional land owners from crocodile eggs is approximately $30,000 to $40,000 a year. The second is through observation of landholder actions. For example, one property that has been receiving income from eggs since the early eighties and there has been extensive clearing of land. However the wetland nesting areas are not cleared, and in some cases well protected by strategic fencing.

The Top End is fortunate in that there does not appear to have been any major destruction of wetlands other than that caused by salt water intrusion: which the government is attempting to rectify. Crocodiles thrive in the pastoral areas of the Mary. The Mary River region is the object of a major, multi-use planning initiative by the government in collaboration with all stakeholders. Conservation issues necessarily figure prominently in the effort.

The major threat to wetlands, reserved or not, is *Mimosa pigra*. Both the Commonwealth and the Territory governments are heavily involved in attempting to solve this problem.

I am not aware of any additional threats in the above mentioned areas, or in other areas. Crocodiles should not be viewed as "the solution" to off-park conservation of wetlands, but as part of a package of initiatives designed to achieve long term good management.

Population structure

This is a serious issue from several perspectives. It is not simply a matter of concern re a growing population. Cessation of shooting in the early seventies resulted in rapid recruitment of a large number of small crocodiles that are now mature, causing an unnatural distortion to what might eventually be a stable age distribution. The consequences appear to be limitation of population growth because of the behavior of large animals, significant mortality among stock, and displacement of large and maturing animals into marginal or new habitats (often frequented by people). The proposed trial wild harvest of large animals is designed to provide an assessment of how significant a constraint large animals are on age structure and population growth, as well as providing for the aspirations of traditional Aboriginal land owners. Selective removal of large animals may provide a practical means of limiting displacement of crocodiles into areas not currently occupied and used by people i.e. prevent the problem rather than try to remedy it after it has happened and when it poses a danger to the public.

The project will determine a sound economic base for the harvesters, and will have a significant "public good" role by providing for better, and more economic management of the problem animal situation. It is worth noting that the US Fish and Wildlife Service in Louisiana uses an annual harvest of large alligators to reduce waterfowl mortality in its wetland reserves.

Loss of stock

There is no necessary relationship between good pastoral practice and fencing of river banks and water holes. Whether significant damage occurs depends on variables such the nature of soils and banks, nature of vegetation and the density and timing of grazing by stock. Unless these are defined it is impossible to determine the merit of the practice. The cost of such fencing would also need to be taken into account in relation to the environmental and other costs of not fencing. Each situation is likely to be different, and no simple overall answer is possible.

It is worth noting that in many areas fencing would not alleviate the crocodile problem. Seasonal inundation of wetlands and fences leads to expansion of crocodiles well beyond their usual confines.
The Commission has reports of crocodiles causing significant problems to stock along the Victoria River (Coolibah and Bradshaw Stations), the Roper River (Roper Valley, Elsey and Urapunga Stations), and from the Mary/Adelaide floodplains (Mary River, Swim Creek, Opium Creek, Melaleuca, Marrakai and Woolner stations). There are likely to be additional instances, but these are the major problem areas. The area of land enclosed by the stations listed above is substantial, and they contain major crocodile populations.

Research

This has been fully documented above.

Public recognition

Value from crocodiles may be economic or, may simply be a feeling that they are worth conserving. The difficulty is that they are not mutually exclusive realities. The crocodile has produced employment, income from tourists visiting wild populations and those on farms, income from returns on eggs collected, income from sale of crocodile products in stores, and income from primary production on farms. As yet there has been no complete analysis of these economic realities. For tourists and local residents, the crocodile provides memorable viewing experiences of large and dangerous animals in the wild.

Balanced against these positive factors is concern (often loudly and publicly expressed) re the dangers posed by having large crocodiles mixed with people and stock. If there was no management program, if there was no economic benefit, and if over 15,000 animals were not being removed from the wild each year, I believe that it would become next to impossible to contain political pressure from people for the removal of all crocodiles from all areas outside parks and reserves.

One possible indication of the importance of economic value in changing peoples views comes from my conversations with one of the major victims of stock loss to crocodiles. The property owner clearly stated that if he was able to economically gain from the crocodiles on his land he would be quite happy to put up with the stock losses.

The Commission's actions re crocodile management are designed to keep the positive side of

the ledger as far ahead of the negative side as can possibly be achieved.

Several general conclusions can be reached re the Commission's management of saltwater crocodiles. (i) The crocodile population is growing. (ii) Probably because of the Commission's proactive publicity campaign, there have been remarkably few human mortalities or damaging attacks. (iii) Thousands of tourists and residents are benefiting from crocodiles. (iv) The crocodile industry is not receiving massive support from government. (v) Traditional Aboriginal landholders are increasingly becoming involved in and gaining benefit from the industry. (vi) Research allocations are designed to provide for better and more sensitive management of the population and the danger it poses to people. (vii) As part of a multi factor approach, there have been major achievements re reservation and management of wetlands. (viii) The recent innovation of providing landholders with permits for egg collection has resulted in greater public involvement in crocodile management, particularly among Aboriginal landholders.

With the new crocodile management program and the increasing emphasis on landholder involvement, significant progress is expected in the conservation of Top End wetlands over the coming years.

Yours sincerely

W J FREELAND
Deputy Director (Wildlife)

5 February 1996

B 72694 $30 NCC