RECREATIONAL HUNTING

AN INTERNATIONAL PERSPECTIVE

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By Johannes Bauer & Jack Giles

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EXECUTIVE SUMMARY

Australia is rich in vast open, unpopulated spaces and natural diversity and is remote to the rest of the world. Populated by less than 0.4 percent of the world's human population, Australia is still trying to come to terms with 200 years of European land use imposed on a non-European landscape. Many of these attempts are complicated by conscious and unconscious choices on what is desirable for Australia, what is deemed economically necessary and what should be Australian. The tourism industry has emerged as the only player that acknowledges Australia's unique landscapes and species as its major resource to attract foreign visitors. In doing so it has successfully linked Australia's natural diversity and ancient aboriginal culture with the dominant European and increasingly multicultural society. Tourism in Australia has become a land use in its own right that can be superimposed on protected areas, cities and agricultural production landscapes. Tourism utilises native wildlife as one of its major resources. So far industry and policy makers call this utilisation 'non-consumptive'. Animals are viewed either in their native habitats, in wildlife refuges, or in zoos.

Hunting also utilises wildlife and one of its contexts is recreation and tourism. In order to understand this aspect, one must understand hunting.

This review analyses the role and importance of hunting by drawing on examples from Australia and overseas. Hunting may be undertaken for sport, subsistence, traditional and cultural purposes, commercial harvesting of wildlife, animal control, market rearing and trophy acquisition. The wide range of positions of hunting legislation, attitudes towards hunting, cultural significance of hunting and diversity of species being hunted provides an opportunity to identify the role hunting can and does play in contemporary society. It also allows us to understand how this role changes as rural societies become urbanised and as developing nations progress. Last but not least this review examines how western attitudes have influenced prevailing global perceptions on hunting.

Although now replaced in most societies by agriculture in its contribution to food production, hunting continues to play an important role in many countries. In the Northern Hemisphere (mostly industrialised) approximately 20 million people hunt for sport or for subsistence, harvesting in excess of six million ungulates per year for consumption. From figures available, we estimate that this industry is worth in excess of 60 billion US dollars in the Northern Hemisphere. Less documented and accountable is the hunting, which continues to support many hundreds of millions of people in developing countries, many of them from indigenous societies. For these people hunting can be an essential component of their socio-economy. There is however one major difference in the importance of hunting between developed and developing nations. Game in developed countries generally thrives. In developing countries, however, game animals have become scarce or are inaccessible in protected areas.

Hunting in industrialised countries, and the entire 20.6 billion-dollar industry in the US can be viewed as recreational. This is true also of the one billion-dollar industry in Australia. This review aims to give an understanding of the importance of hunting in Australian society. It documents recreational hunting as an important recreational activity for many Australians. It also documents hunting as focal to the cultural heritage of Aboriginal people.

This review is based on the long-term involvement of the authors with ecology, wildlife conservation and aspects of hunting in various regions of the world. It analyses their observations in terms of their relevance to Australia drawing on many examples, case studies and regions.

In order to complement this past personal involvement, this paper:

- Reviews the available literature on hunting;
- Reviews a selected component of grey (unpublished, reports etc.) literature on hunting;
- Incorporates and analyses the Australian situation on hunting;

- Analyses aspects of the global trophy hunting industry;
- Analyses some Australian and overseas organisational, policy and legislative arrangements for hunting; and
- Documents discussions with key players in the industry, and examines regulation and legislative processes.

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1. GENERAL PRINCIPLES OF HUNTING

1.1 Hunting And Human Origins

Why do people hunt? What are the hidden motivations that incite so many people in modern society to take up their weapons, go out into the dark, endure hardship, danger and discomfort to shoot some poor and unsuspecting creature and at the end of the hunt, hang this creature's head over their fireplace? Why was hunting one of the most guarded privileges of aristocracy in many cultures and persists today as the pursuit of the rich in search for entertainment and the need of the innocent and the poor?

Nowhere is the ambiguity of hunting - at the same time 'the wildest yet most human of activities' (Cartmill, 1993) - so evident as in theories of human evolution and origin. Ever since Raymond Dart put weapons into the hands of fossil apes, hunting has played a central role in theories of human origin. Did we become human because we hunted? Cartmill (1993) explores this question and concludes that it is our capacity to hold superstitions and beliefs, rather more so than our ability to carry weapons and tools, which make us human. We have not become human because we hunted, but we have rather made hunting human. Rituals, superstition and beliefs surrounding the activity of hunting are what distinguish it from the killing that goes on between animals.

Regardless of what urges people who take pleasure in the hunt and of the symbolism it carries, there is a powerful link between the hunter and the prey.

Hunting is inextricably linked to weapons. Hunters kill for sport using weapons designed to take life. This brief observation contains much of the dilemma of the hunter. The weapon, without doubt the most consistent and dominant tool in human evolution and history, remains so in modern society, however modified to bizarre purposes.

> *Not in innocence.....was mankind born.....In neither bankruptcy nor bastardy did we face our long beginnings. Man's line is legitimate. Our ancestry is firmly rooted in the animal world and to*

its subtle yet antique ways our hearts are yet pledged. Children of all animal kind we inherited many a social nicety as well as the predators way. But most significant of all our gifts...was the legacy bequeathed us by those killer apes, our immediate forebears. Even in the first long days of our beginnings we held in our hand the weapon, an instrument somewhat older than ourselves.

(Robert Ardrey in 'African Genesis' 1961)

1.2 Cultural Significance Of Hunting In Traditional And Modern Society

Hunting continues to be an important land use and an essential part of the cultural heritage of many indigenous societies (Berger, 1988). It continues to be practiced in many traditional rural societies of Europe, North America, Russia's vast territories and Australia. Furthermore it plays an important role in the economy of a range of western countries as traditional recreation (Kalchreuter, 1989). For example, Canada derived more than 1% of its GDP from the fur industry (Bauer, 1990a,b) while recreational hunting is a multi- billion dollar industry in the US and in Europe (DJV Handbook, 1991; DI *et al*., 1996). In Europe hunting also remains of cultural significance (Ermala,1982; Kalchreuter,1989).The hunting language in Germany and Scandinavia forms an essential part of the Germanic cultural heritage. Hunting is still of enormous significance in providing protein for the poorest of the poor in most countries of South-America, Africa and Asia (Robinson and Redford, 1993; Alvard *et al*., 1997; Berkes *et al*., 1994; Colell *et al*., 1994; Collins *et al*., 1997; 1995; Fa *et al*., 1995; IIED, 1994). Last but not least, well-managed hunting has proven to be important to conservation because by its very nature it is opposed to modern and intensive agriculture and forestry (Leopold, 1933).

In addition to these arguments there remains that expressed by Aldo Leopold, who, sixty years ago confessed that his dilemma was that he could not live without wild things and without hunting wild things. Nobody would question Aldo Leopold's commitment to wildlife conservation. Many would question his commitment to hunting. Yet, even now, sixty years later, in highly industrialised countries there are many who enjoy hunting and there are hunting lobbies that can exert

a considerable influence on society to the point of influencing government decisions (Pucell, 1999).

Hunting faces without any doubt its biggest crisis in history. In many countries where hunting could be important, most of the once vast prey resources have gone, often replaced by millions of sheep and cattle that degrade landscapes. In the remaining countries where prey continues to exist in sufficient numbers, hunting has become unacceptable to many members of the urbanised public.

What has gone wrong for the hunters and what are the challenges hunting is facing in order to survive? Should hunting survive at all? There are no simple answers to these questions.

Many hunters have become very defensive about hunting and have tended to shy away from open discussions. Similarly, the establishment of conservation legislation in many developing countries has often outlawed hunting. Where hunters have looked ahead, they have been very successful. Before we attempt to give some examples of this, in particular its relevance for the Australian hunting industry, let us briefly reflect on the values and ethics of hunting; where they come from and why they can have an important place in modern society. This is particularly so in a modern global society that is less shaped by western values and where indigenous people, away from urban elites, can maintain their place.

1.3 Land Stewardship, Hunting Values And Ethics

If we talk about hunting and conservation we tend to talk about sustainable yield, impacts of trophy hunting, the efficiency of hunting as a means to regulate populations of pest species, the check of the spread of diseases and the size of trophies. While these are all vital elements in hunting, they do not sufficiently describe the reality of hunting.

During human evolution, humans strove to exert increasing control over wildlife. Initially, this was in order to secure a continuous food supply and to survive powerful predators. Now, with increasing technological advancement, wildlife is sometimes seen as a hindrance to development, while a large yet rather powerless hunting minority,

amongst them 250 million indigenous people, lament it's demise. There is no better way to express this dilemma of humankind, than by citing Aldo Leopold in his preface to 'Game Management' written 64 years ago.

> *We of the industrial age boast of our control over nature. Plant or animal, star or atom, wind or river- there is no force in earth or sky, which we will not shortly harness to build ' the good life' for ourselves. But what is the good life? Is all this glut of power to be used for only bread -and butter -ends? Man cannot live by bread, or Fords, alone. Are we too poor in purse or spirit to apply some of it to keep the land pleasant to see, and good to live in? Every countryside proclaims the fact that we have, today, less control in the field of conservation than in any other contact with surrounding nature. We patrol the air and the ether, but we do not keep filth out of our creeks and rivers. We stand guard over works of art, but species representing the work of aeons are stolen from under our noses. We stamp out the diseases of crops and livestock, but we do not know what ails the grouse, or the ducks, or the antelope. In a certain sense we are learning more rapidly about the fires that burn in the spiral nebulae than those that burn in our forests. We aspire to build a mechanical cow before we know how to build a fish way, or control a flood or handle a woodlot so it will produce a covey of grouse.*
>
> **(Aldo Leopold in the preface of his classic 'Game Management', 1933)**

Seventeen Years later, Aldo Leopold, in the foreword for his 'Sand County Almanach' is even more outspoken. He writes:

> *.....like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher standard of living is worth its cost in things natural wild and free. For us of the minority the opportunity to see geese is more important than television, and a chance to find a pasque-flower is a right as inalienable as free speech. These wild things I admit had little human value until mechanisation ensured us of a good breakfast, and until science disclosed the drama of where they come from and how they live. The whole conflict thus boils down to a question of degree. We of the minority see a law of diminishing returns in progress, our*

opponents do not..... Conservation is getting nowhere because it is incompatible with our Abrahamic concept of land. We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong we may begin to use it with love and respect. There is no other way for land to survive the impact of mechanised man, nor for us to reap from it the aesthetic harvest it is capable, under science, of contributing to culture. That land is a community is the basic concept of ecology, but that land is to be loved and respected is an extension of ethics....our bigger-and-better society is now like a hypochondriac, so obsessed with its own economic health as to have lost the capacity to remain healthy. The whole world is so greedy for more bathtubs that it has lost the stability necessary to build them, or even to turn off the tap...

(Aldo Leopold 1949 in his Foreword to 'Sand County Almanach', 1949)

Today, 48 years have passed since Aldo Leopold wrote these bitter words and it may be speculated that not even he, who foresaw the future of things natural, wild and free so clearly, could have even imagined to what extent this apocalyptic vision has become part of our everyday reality.

Aldo Leopold was referring to the United States of America. At the time when he was writing, Burma or Kenya were still places so remote, that it would only have occurred to the most eccentric mind, to speculate on the state of their environment. Now, half a century later these countries are well known. Developments both in terms of population increase and industrial progress in tropical regions have reached levels that destroy natural ecosystems and resources at a rate and scale that extends far beyond the regenerative power of the natural environment.

During the past five years many things have happened, numerous stances have shifted and even dissolved. New conservation groups have started and they are continuing to talk about the wise use of wildlife. Increasing numbers of textbooks, publications, conferences etc. have begun to embrace this principle. Wildlife management and hunting, although regarded with suspicion by earlier conservationists, has become more relevant than ever. In our definition, therefore, the terms wildlife management and hunting embrace a variety of

strategies that can be employed to achieve specific aims. These may include: population maintenance, population control, population utilisation and population restoration. Our ways of doing this might differ. They might be commercial or recreational, however they should not include wastage. How do we make the best choice in terms of wildlife management and acceptability to the public?

We will now deal with various aspects and forms of hunting in different places in order to derive at least some answers to our questions. Let us now first talk about four major forms of hunting:

1. indigenous hunting,

2. traditional hunting,

3. market and commercial hunting and

4. recreational or sport hunting.

Before we do this, let us look at the role of hunting within changing ecosystems and its impact.

2. HUNTER-WILDLIFE INTERACTIONS IN ECOSYSTEMS

2.1 Hunting As Land Use-Theoretical Considerations

> *'The emergence of man, the shift in his role from minor component of natural systems to predominant and sometimes exclusive occupant of modern industrial cultures is a story of change in his basis of power support...When there are no special energy sources for an ecological system except the input of the sun, man is a small part of the scheme, but he is protected by the great stability, complexity and staying power of the natural system...the energy resources available to man are insufficient for him to do damage to his supporting system. Their diversity is a protection against epidemic decimation of his food circuits.'*
>
> **(Odum, 1971)**

With these words, Odum (1971) described the role of humans within original, relatively stable environments as they were still found in the tropics more than 25 years ago. These systems contained plant and animal products in great diversity but in small densities, and they required considerable gathering energies as well as natural resource knowledge for their utilisation. A hunting and gathering economy is, by its nature, capable of supporting only a relatively low density of humans (Diamond, 1998).

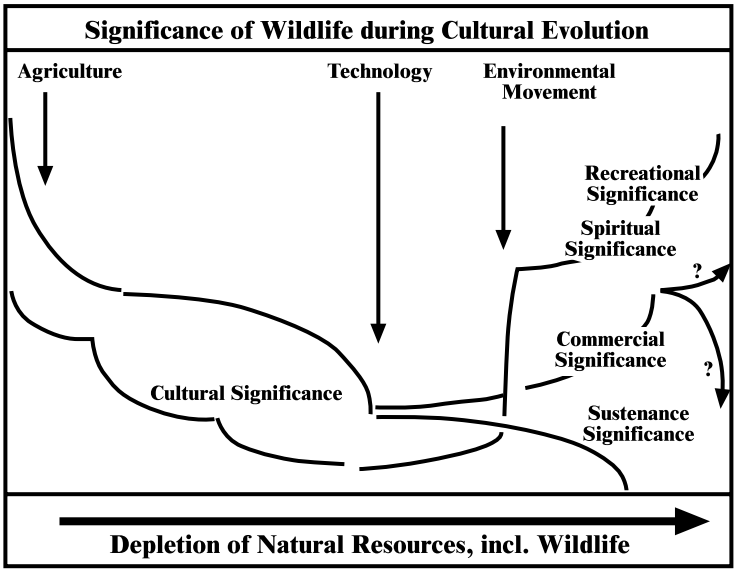
The story of earth zones with high variability and fluctuation of climatic conditions is different. Where warmth and cold, drought and heavy rains alternate 'any system must either put great energies into special physiological adaptations to survive the fluctuations or, when conditions are too severe, continually establish and re-establish a system that dies back between favourable periods' (Odum, 1971). The maintenance of such systems depends on recolonising abilities as well as on stable seasonal cycles. They are characterised by relatively low species diversity (few species of pulsating populations, temporary large storage and channelled energies (Odum, 1971)) and by large-scale migrations (e.g. caribou, bison, fish, waterbirds and shrimp). Primitive agriculture was able to exploit this situation by capturing and simplifying these pulsating systems and concentrating their storage phases in humans and their animals. Generally, these solar-energy

based agricultural systems were preceded by nomadic hunting cultures that involved following food supplies in their migrations.

During the transition from nomad-hunting cultures to sedentary agriculturalists, wildlife shifted from resource to competitor and threat. The increasing importance of domesticated mammals for humans, along with crops, led to the suppression of predators and competitors in most areas where successful cultures and civilisations arose (Diamond, 1998). During this phase the importance of wildlife for sustenance declined along with numbers, yet cultural significance was often maintained as urban elites increasingly valued wildlife for the hunting sport it provided. While the decline in the use of non-marine wildlife for sustenance has continued, along with the onset of technology and environmental modification in modern agriculture, there has been a re-emergence of cultural significance of wildlife species through recreational hunting and conservation (Figure 1). Now, wildlife utilisation and hunting have obtained considerable economic significance in the industrialised northern hemisphere. This significance is more or less based on the enormous resilience of several species of deer and wild boar and their adaptability to modern forestry and agriculture (which can make them pests). Meanwhile further south, more diverse and more abundant wildlife resources, mostly in developing countries, are now too depleted to remain as a resource even for sustenance. The north-south dichotomy is demonstrated by the fact that, in the developed northern hemisphere, more than 15 million hunters annually harvest between 4-8 million ungulates, mostly deer, every year (sustained and mostly endorsed by conservation) while in countries such as Africa and parts of Asia (e.g. northern India, China and Nepal), wildlife resources have either become greatly depleted or cannot be harvested any longer, due to imposition of western conservation values. While wildlife in the north feeds a multi-billion dollar hunting industry (recreational, commercial, and traditional) it remains a threat and competitor in the developing and often starving south (where it is needed for sustenance).

This comparison postulates that highly modified landscapes can sustain large populations of wild herbivores, in fact, favour them to such a degree that they can become a major economic and recreational resource.

Figure 1: Significance of Hunting During Cultural Evolution



2.2 Impacts Of Hunting

The utilisation of wildlife by humans is diverse. Many ecosystems of the earth could only be colonised by humans because some wild species had developed highly specialised evolutionary adaptations millions of years before the emergence of humans. Plants and animals have been and still are the major sustenance for humanity, yet there has been a historical shift in diversity and utilisation type and intensity. The decline in diversity, abundance and distribution of the World's vast populations of hoofed animals, carnivores, marine mammals and crocodilians has been a corresponding feature of the increase of humanity, the domestication of some species and the development of technology. While unregulated exploitation, competition and habitat

change has often been the initial cause for this decline, a range of other factors, above all habitat loss and habitat deterioration, have prevented and continue to prevent the recovery of many species from over hunting.

We have divided what we consider significant times for the decline of animal populations, at least partially through hunting, into four periods in human history and expansion:

1. The Great Leap Forward (100 000 BC - 6000 AD)

2. The Rise and Fall of the Great civilisations (6000 BC- 1500 AD)

3. European Expansion (1400 - 1850 AD)

4. Industrialisation (1850- 2000 AD)

2.2.1 The great leap forward

> *Human history at last took off around 50 000 years ago.....the great leap forward coincides with the first proven major extension of human geographic range since our ancestors' colonisation of Eurasia. That extension consisted of the occupation of Australia and New Guinea, joined at that time into a single continent ...between 30 000 and 40 000 years ago...All of those Australian and New Guinea giants (animals) disappeared after the arrival of humans.... we also know that on every one of the well studied oceanic islands colonised in the prehistoric era, human colonisation lead to an extinction spasm whose victims included the moas in New Zealand, the giant lemurs of Madagascar and the big flightless geese of Hawaii.*
>
> **(Jared Diamond, 'Guns, Germs and Steel' 1998)**
> **(Winner of the Pulitzer prize, 1998)**

Although there is a range of theories to explain the demise of mega-faunas, we concur with J. Diamond and T. Flannery (1994) that hunting is likely to have been a major element in contributing to the decline and eventual extinction of many species, particularly in Europe, America and Australasia. Meanwhile the long coevolution of humans with other species in Africa has prevented this (see also

Diamond, 1998). Colin Groves, a leading palaeontologist, argues that there was a mega faunal extinction in Africa on the veldt, and that many species of plains game which had forest dwelling relatives, re-radiated from the forests over thousands of years, much more wary of humans.

2.2.2 The rise and fall of the great civilisations

In Europe, China, Southern Asia and Central/South America great civilisations took shape, mostly because of the presence of annual cereals, which could be stored, and the presence of suitable animals for domestication (Diamond, 1998). During this phase hunting, as the major impact of humans on wildlife, was replaced by habitat change, habitat destruction and increased competition from domestic stock. In order to keep livestock, predators had to be destroyed or removed and in order to reduce crop damage, herbivores were no longer hunted for food but in order to reduce competition with domestic herbivores. During this time large predators were eliminated in many areas. For example, the lion disappeared from Greece approximately 2500 years ago and the last wolf was shot in Germany in the late 1900's. Generally only small animals with high reproductive capacity such as roe deer managed to survive in increasingly modified agricultural landscapes where they were pursued with increasingly sophisticated weapons.

2.2.3 European expansion

Never before were species driven to extinction within such a short period of time than they were during the expansion of Europe. The North American bison, roaming the great prairies in numbers estimated at around 60 million animals, was almost extinct at the beginning of the 20th century. Similarly, European settlers exterminated many island species, for example the dodo, within a few years.

2.2.4 Industrialisation

The development of modern industries, modern western agriculture and associated industries have replaced the importance of hunting and clearing for agriculture as an impact on many wildlife populations around the turn of last century. Wildlife, already greatly reduced in abundance and displaced from many agricultural areas, suddenly was limited in range to huge areas of highly modified and homogenous landscapes. Many species succumbed to this and others are continuing to do so. A side effect of this habitat simplification was the emergence of industrially adapted species that, due to habitat flexibility and high breeding potential, were suddenly able to take advantage of vast homogenous landscapes with no predators. For example, roe deer and wild boar in Europe, White-tailed deer in North America and large Kangaroos in Australia are species, which have benefited from human environmental modifications and have become pests (Bauer, 1990 a, b; Caughley, 1977, 1976, 1985; Frith, 1972; Leopold, 1933).

2.3 Hunting And Species Extinction

Hunting has played a significant role in the extinction of species (Caughley & Sinclair, 1994, Caughley & Gunn, 1997). There is controversy, however, about its role in the demise of entire mega fauna species (Diamond, 1998; Flannery, 1994). Specific impacts will only be described in this review on three important groups; large and medium sized terrestrial predators, ungulates and waterfowl.

2.3.1 Large and medium sized carnivores

Carnivores in human history have been both powerful predators and competitors. Recent researchers have suggested that the domestication of the dog from wolves has been one of the most significant factors for human evolution in the northern hemisphere and for the domestication of large herbivorous mammals. Other researchers have suggested (Diamond, 1997; Jewel, 1969) that humans in Africa have never domesticated large herbivores because of the presence of many powerful predators or because of problems coping with predators and their competition (eg. Schaller, 1972). Large predators were the main competitors and threat to the human

species. The hunting of predators has shifted in its context and role during the ascent of the great civilisations and finally in the modern world. Hunting large predators has probably always had implications for the status of the successful hunter. This is evident in most cultures of the world and remains so in modern society. Hunting large carnivores became so significant for status, that in Egypt it was the privilege of the Pharaoh's. In Nepal it remains the privilege of the Royal family to hunt tiger or leopard and the modern safari hunter values the trophy of a lion skin more highly than any other hide. One of the consequences of this importance is reflected in the decline of the large cats and wolves that are considered the biggest threat to humans and the most prestigious to hunt. This pattern of decline followed almost without exception the development of the world's major civilisations in the subtropical and temperate regions. Therefore, the distribution of large cats in particular reflects in many ways the ascent of the human species. Dunlap (1988) describes how small remnants of wolf populations continue to haunt the dreams of the citizens of one of the world's most industrialised nations, the USA.

> *'Saving the wolves was important to many Americans, but there were significant numbers, particularly among those who lived in wolf country, who wanted the creatures dead. In the last few years, however, the situation has been changing. We now seem to be working out a place for the wolf and the coyote in our civilisation coming to some terms-for this generation at least-with nature'*
>
> **(Thomas. R. Dunlap 'Saving America's Wildlife', 1988)**

In the modern world many of the world's predators are protected. Yet despite protection the threat of large predators to human livestock and the continuing threat of large carnivores for humans (Maskey & Bauer, 2000) remains as a factor contributing to their decline.

2.3.2 Ungulates

Ungulates, in particular the even-toed animals (Artiodactyl a) with its two major families the Cervidae and Bovidae, are the most successful, diverse and widespread group of large mammals, who have also played a major role in the evolution of human civilisation. Ungulates have reached their major diversity and biomass in the open savannas of Africa, and were once major components of many temperate and

arctic ecosystems of the Palaearctic and Nearctic. Ungulates, as terrestrial herbivorous or omnivorous wild mammals weighing on the average more than 40 kgs, comprise a majority of the animals utilised for domestication (Diamond, 1998). With only one exception (the Alpaca) the 'ancient four' (sheep, goat, cattle, pig) were domesticated in Eurasia 4500 - 10 000 years ago (Diamond, 1998). Extinction of ungulate species quite generally was related to their body size. In Germany for example the Auroch, the largest Ungulate species in Europe, was exterminated in 1541 (Kalchreuter, 1989), followed by the smaller European Bison towards the end of the 19th century and the even smaller Moose in the early twenties. Now even the status of Red deer, the next species according to size, has become critical for many forest landscapes, as it is unable to follow seasonal migrations and is often forced to subsist extensively on forest regeneration or even bark of adult trees. Roe deer, as the smallest species, able to exist in densities of up to hundred animals per hundred ha of forest land (Bauer and Linn, 1993a, b, c; Bauer *et al*., 1986) remains as the only common species in lowland forests.

2.3.3 Waterfowl and seabirds

Waterbirds are favourite game species throughout the world. The majority of species are hunted throughout their range, and often throughout the year (Kalchreuter, 1987) with several million shot (Scott, 1982). A detailed review by Kalchreuter (1987) of the large body of research in particular of ringed birds suggested a general increase of many duck populations in Europe over the past 30 years, despite habitat loss in western Europe and considerable hunting pressure. The review also suggested that duck hunting, which is mostly carried out in the autumn -winter seasons is compensatory in nature. Similar results were obtained in an analysis by Anderson and Burnham (1976) for North America. Commercial opportunistic and recreational harvesting has been responsible for the extinction of a number of sea and waterbirds, such as the great Auk and the Hawaiian goose. Now, seabird species are being harvested as adults, however there always has been an extensive exploitation of eggs and juvenile birds along coast lines and in particular on islands. In Tasmania and New Zealand the exploitation of mutton birds remains an important commercial activity for some local communities and for indigenous people, while on islands in the South Pacific there is a largely unregulated collection of seabird eggs (Spennemann, pers. comm.)

2.4 Types Of Hunting Impact

Hunting, if unregulated and without regard to sustainability of yield and behaviour, will destroy populations of animals and has done so many times in the past. The impact of hunting however is a highly variable parameter that is determined by factors such as:

- Type of hunting (chase, stalk, ambush, group, dog aided etc.)
- Species hunted (low recruitment, high recruitment, alert, primitive etc.)
- Hunting intensity (occasional, regular, continuous)
- Hunting season (rut, season of births)
- Daytime (resting periods, feeding periods)
- Hunting tools (firearms, bow, trap, snare)
- Hunting transport (on foot, horse, elephant, car, helicopter).

In societies where hunting is well regulated and important such as in Canada, the USA, Russia, Germany, France and UK, a great body of research has been carried out on its impacts and on how to reduce these. Our review indicates that there is still great room for improvement in hunting management and that much of this research will require better mechanisms of implementation.

Hunting can also have indirect impacts on the environment or on the species. This can be, for example, the impact of lead shot in frequently used waterfowl hunting areas (Marteo *et al*., 1997; Medvedov, 1999; Noer and Madson, 1996), impacts on non-target species (Noss, 1998 a, b) or an impact on habitats (e.g. through off-road driving with vehicles) or behaviour (Filli and Nievergelt, 1996). There are also many hunting methods such as snare and traps, which are common in particular with illegal activities that kill many non-target species. Finally, hunting can cause different levels of disturbance, which can greatly impair the fitness of a population or have a level of perceived

or real cruelty which society finds unacceptable (Bauer, 1991a,b; Pohlmeier *et al*., 1995).

There are also impacts of hunting which can be less obvious which might however impact on the long-term genetic fitness of a species. One of these examples is trophy hunting that is highly selective towards mature and large sized individuals. There are theoretical papers that make the claim that this type of hunting can have negative consequences (Caro, 1994; Caro *et al*., 1998; Geist, 1988), however only very few practical studies have attempted to quantify the impacts of a change in sex ratio or in age distribution on the fitness of males (Bauer, 1986, 1990; Bauer & Linn, 1993b; Bauer & Plieger, 1990; Ginsberg and Milner-Gulland, 1994).

A review of the diverse and extensive literature brings us to the conclusion, that if consideration to this wide range of parameters is given and based on detailed research, many hunting impacts can be reduced or even eliminated. If they cannot, hunting must be stopped or alternatives sought (e.g. the replacement of lead shot with iron shot). It is the worldwide experience that impacts of hunting can never be wholly eliminated, particularly in remote regions or countries that lack legislation or infrastructure to enforce regulations. Sophisticated game management requires a consistent, well funded and objective research component and the legislative and practical means to implement it through a responsible and well trained group of hunters.

2.5 Conclusions

The history of hunting and exploitation of wildlife is very diverse. Legislative steps have been undertaken in the conservation of many terrestrial species, the majority of which have had massive declines in numbers during the past 30 years in developing nations. The Convention on the International Trade with Endangered Species (CITES) has been important in reducing exploitation, which is trade based and goes across borders. There are, however, many instances in countries where exploitation and over hunting goes on unhindered despite prohibitions in national legislation or international trade barriers. During a visit in Sichuan Province in April 2000, one of the

authors counted 15 snow leopard skins on sale in one village (with the world population of snow leopards estimated at 2000 animals).

This growing body of national legislation and international agreements however has been successful in rehabilitating many wild species. However, the majority of game animals in developing nations are too depleted to constitute a game and hunting resource.

There remains also the difficult question on the rights of indigenous societies. Indigenous people have lived off marine and terrestrial animal resources for thousands of years with limited damage to the ecosystem. The gradual domination of European economic practices changed all this. Fur trapping and whaling have become heavily regulated commercial activities to the inevitable detriment of those indigenous groups, particularly in Siberia, Greenland and the American Arctic, who use marine and other arctic animal products as an important cash input to a subsistence economy. The same pattern has occurred in many parts of Asia and in South America (e.g. Robinson and Redford, 1993; Bodmer, 1995; Colell *et al*., 1994; John *et al*. 1995). However, there have been changes that are encouraging. Canada now has adopted a system of regulated indigenous hunting, which includes the taking of polar bear. Indigenous villages have the choice to either carry out their own harvest quota per year or to sell the hunting licence to trophy hunters from either Europe or USA, who must harvest the bear in indigenous fashion and under indigenous guidance. The income generated in this way exceeds the product value many times over and generates opportunities of income for these communities that could not be realised in any other indigenous fashion.

3. FORMS OF HUNTING

3.1 Indigenous/Sustenance Hunting

'When the whites first arrived in this area, they thought we were wild animals and chased us into the forest. Now that they have found out that we are people they are chasing us out again'.

(Okiek hunter-gatherer, Mau Forest, Kenya, 1992, IIED, 1994)

Indigenous culture, modern development and conservation are intricately linked and expressed in hunting. There are numerous examples from Africa, Eurasia and America where the decline of indigenous people was initiated by removing their right to hunt. The destruction of wildlife populations during the wake of European colonisation was often the accidental and sometimes intended means of destroying indigenous communities and there are, even now, examples where modern day conservation has continued this unfortunate pattern by expelling people from traditional hunting grounds (Turnbull, 1969).

Western society has fundamentally changed the support base for indigenous cultures. While this process cannot be reversed, there are several alternatives for the future. One alternative will be the disappearance and absorption of these cultures, while another alternative will provide the cultures with a choice or compromise between the old and the new ways. The trapping industry of furred animals may serve as an example of how such conflicts may be resolved.

Case Study 1:
Humane Trapping in Canada

The fur industry has been and still is a significant industry for a great number of people in the holarctic region. One percent of Canada's GDP was derived from this industry which involved 400 000 people and was the major income for 100,000 Canadians who were trapping in winter for additional income, entertainment and as part of their traditional way of life (Bauer, 1990a,b). There is a similar industry in Scandinavia and an enormous yet, in the west, mostly unknown fur bearer industry in Russia. The anti-fur movement that started in the sixties and continues today has virtually destroyed this industry overnight. While conservationists have hailed this as a general success story there was another side to the coin, which has received very little publicity, i.e. the resulting impact on many holarctic indigenous communities. Inuit, Indians, Laps, and Siberian tribes have relied on this industry to maintain their traditional lifestyle amidst a growing dependence on a cash economy.

The establishment of the 'International Committee for Humane Trapping' in 1987 by the International Standardisation Organisation (ISO), pushed, (not surprisingly) by Canada, has shown that there is a way of dealing with conflict and getting different parties to work together. It is important the parties share at least one common belief and acknowledge the other parties' right to a different opinion. (See, Bauer 1991a,b; Organ et. al. 1998).

Most western hunters who have shared hunting or fishing experiences with indigenous groups have not only found it as the most powerful way to communicate between cultures but feel extremely privileged and enriched. Polar bears in Canada are protected, except from Inuit, who can sell them to fee-paying hunters and have to guide these in a traditional way. This is not only a profitable arrangement for both groups, but also a way to come to know each other, learn from each other and make the Inuit realise that they have something very precious and traditional that they can trade - something which might encourage them to preserve the old culture.

3.2 Traditional/Sustenance Hunting

Traditions are important in both modern and indigenous societies. Hunting traditions are some of the oldest and go far beyond the killing of game. Hunting has its own language and elements of land stewardship that go back thousands of years. Hunting has many colourful customs and was a main component in visual arts, music and poetry of many societies and cultures. Hunting is also a powerful tool to teach the new generation principles of ethics, land stewardship, the connection to the country, discipline, responsibility, community, sharing and conservation. With the growing together of cultures, often at the expense of one, traditions however require change. Yet where should change come from? Should it be superimposed by the strong northern neighbour or should it come from within? Two case studies demonstrate this.

Case Study 2: Passerine Hunting in Southern Europe

Hunting has much to do with tolerance and insight. Every year many millions of songbirds from northern Europe migrate south to Africa, along a migration route where millions of Belgian, French, Italian and Spanish hunters wait with nets, traps, shotguns and sometimes poison. Most people in northern Europe find this habit, which kills an estimated 2-300 million birds each year, appalling, while people in Italy find it an old and beautiful tradition and a culinary feast during autumn. The argument has become more rationalized and now focuses on 'compensatory mortality'. Research commissioned by FACE, the European hunting organisation seems to suggest, that all this killing does not affect populations, certainly much less than the destruction of rainforests. No matter what the outcome, this example demonstrates the importance of values, objectivity, tolerance and sometimes de-sensitivity (see Kalchreuter 1984, 1987).

Case Study 3:
Traditional Whale Hunting in Norway and Japan

Whale hunting is an emotional issue that is unacceptable to most conservationists, or even terrestrial hunters. The fact remains that many indigenous groups rely on whaling and that for some countries such as Norway and Japan it is an ancient tradition of society, linked with many old treasured customs, cultural expressions and heritage. With the recovery of many populations of whales this discussion has become more heated (see also OEN, 1997).

3.3 Commercial Hunting

The boundaries between traditional, sustenance and commercial hunting are poorly defined with the former two having always been at least partly commercial in nature. Deer hunting in Germany, although defined as recreational and traditional, accommodates the commercial and cultural aspects. In the Black Forest in southern Germany, 60-80% deer hunters are residents - farmers, restaurant owners or foresters. The deer are harvested both traditionally and for recreation and are sold for profit, while in urbanised areas such as Stuttgart, many hunting blocks are leased by urban people, who hunt primarily for recreation and prestige, with the sale of venison being secondary.

A model of commercial hunting and harvesting which fits most closely the conventional definition is kangaroo harvesting in Australia and deer harvesting in New Zealand as it was practised from the early seventies to the late eighties. In these two cases, intensive and, often indiscriminate harvesting of a large number of animals as efficiently as possible is being carried out by a group of professional people.

Case Study 4:
Ungulate Harvesting in New Zealand

Challis (1983) showed the changing nature of offtake between 1961-1983 from control over commercial kill to live offtake for farmstock. New Zealand exported between 1958 and 1981 approximately 1.5 million carcasses of deer (Challis, 1983).

Helicopter harvest of Chamois in New Zealand in 1981

Case Study 5:
Kangaroo harvesting in Australia

In Australia the commercial harvest of Kangaroos continues to play an important role for many rural areas, (Grigg, 1995; Lunney, 1995) The value of this industry is estimated around 280 million Australian dollar (Switala, 1995). Kangaroo Hunting plays an important role for pastoralism, as competition with Kangaroos is known to reduce carrying capacity of farms significantly (Davies, 1996, Grigg *et al.*1995)

Professional hunters carry out commercial harvesting with permission from landowners. The farmers are compensated for the use of their land for hunting.

3.4 Recreational And Sport Hunting

'What is sport?' For unnumbered centuries physical combat between men was economic fact. Battle was part and parcel of the daily struggle to get, or to keep a place in the sun. As the economic need for battle became more and more occasional, it was delegated to specialists. But the instinctive zest for physical combat did not disappear hence athletic sports and games. Physical combat between men and beasts was likewise an economic fact. Since first the flight of years began, it was part and parcel of the daily business of getting something to eat. Gradually agriculture and commerce supplied other and better means of subsistence. But the hunting instinct, the love of weapons, the zest in their skilful use, did not disappear with their displacement by economic substitutes. Hence sport with rod and gun. Socially speaking, these surviving sports are an improvement over their economic antecedents. Football requires the same backbone as battle, but avoids some of its moral and physical retrogression. Hunting for sport is an improvement over hunting for food in that there has been added to the test of skill an ethical code, which the hunter formulates for himself, and must live up to without the moral support of bystanders. That the code of one hunter is more advanced than that of another is merely proof that the process of sublimation, in this as in other atavism, is still advancing'.

(Aldo Leopold 'Game Management', 1933)

What experiences do people seek when they hunt? A brief summary might describe some of these.

3.4.1 Skill hunting

Hunting requires a wide range of physical and mental skills. Hearing, eyesight and smell have to be coordinated with movement, patience and knowledge of the behaviour of the prey. This combination of sensory perception, movement skills, immersion in nature and knowledge on environmental stimuli makes hunting a unique experience that can take a passionate grip on people.

3.4.2 Waterfowl hunting

Waterfowl hunting in modern society challenges the shooter with live targets that are more mobile and unpredictable than even the most sophisticated clay pigeon.

3.4.3 Altavistic experience/romantic hunting

This hunting experience tries to maximise the mechanical skill associated with the taking of quarry. In the United States many hunters nowadays use black powder muzzle loading rifles, compound bows, crossbows and longbows. While the skills required to kill prey with such weapons is unquestionable, opponents question the humane nature of this type of hunting.

3.4.4 Group/individual hunting

Hunting is both an individualistic and a group experience. Hunting in groups for certain quarry e.g. hare, rabbit, pheasant, partridge, fox etc. is particularly popular in Great Britain, France and Eastern Europe. Cooperative group hunting, often with dogs, for wild pig and deer is also popular in Australia.

3.4.5 Trophy hunting

The collection of hunting trophies is the highly competitive hobby of a considerable number of hunters, especially in North America and Europe and requires a large financial investment. Due to its relevance for tourism it is discussed in more detail (section 4).

Case Study 6:
Traditional Hunting in Germany

To the uninitiated, the ritual of comparing deer trophy's in large halls with lots of green dressed people walking around with earnest faces is a spectacle which does not make much sense or appear ludicrous at its best. To the initiated, it is without a doubt the most important day of the year. Theories about the genetics of antler production abound and there are arguments that have lasted for at least 50 years- still unresolved- as to the effects of inheritance versus nutrition an antler growth. And there are as many different methods to improve the condition of roe deer, to reduce the damage they cause to forestry or to estimate their numbers as there are hunters.

Traditional Deer Hunting of Roe Deer Buck during the 'Blattzeit' (Deer Rut) between 2-10 August

These are fascinating and harmless arguments enjoyed by many thousands of European hunters. They are often useful as they lead to the constant improvement of management and additionally are a stimulating arena for practitioners. No wildlife ecologist, after he/she has been accepted as a partner could resist the lure of communicating with people who share a common interest and enthusiasm for collecting and for whom there is infinitely more to hunting than just shooting animals.

3.5 Hunting To Control Animals

Hunting for animal control is widespread, particularly in industrialised and highly modified landscapes where natural predators have disappeared and where agriculture and forestry (e.g. in clear felling areas) have created abundant food supplies for some species. The control of deer and the prevention of damage caused by deer (roe and red deer in Europe and white-tailed deer in North America) costs the forest industry billions of dollars annually (Ellenberg, 1984; Bauer, 1989,1990a,b). There are also increasing control issues in wild boar populations e.g. in Bhutan, where crop predation by this species threaten many farmers. Animal control as a solution to reduce damage on woody plants has also become a common feature in African countries, especially in regards to elephants (Anderson, 1974, Campbell *et al*. 1996).

3.6 Integrated Hunting

Commercial hunting in many highly industrialised countries is usually related to animal control. Deer hunting in Europe and North America, although not considered as commercial in the true sense, has many commercial aspects. Not the least is the control of a highly efficient herbivore which has increased in abundance within a modified landscape and has become a threat to some commercial activities - in general forestry or agriculture. Similarly, deer control in New Zealand is now commercial, with a lingering and uneasy control component remaining and at times competing heavily with recreational hunting. In most industrialised countries such as Germany, Russia, USA, New Zealand and Australia there is a poorly defined boundary between commercial, recreational and control aspects of hunting which is evident in poorly-defined legislation, marketing catches and lack of continuity and consistency. In Australia, legislation exists that appears to run contrary to progress in understanding. For the purpose of this review we find it most appropriate to call hunting that incorporates different aspects as integrated hunting.

Case Study 7:
Deer Hunting in Europe

Deer hunting in Germany, Switzerland, Austria, Norway, Sweden, Denmark, Finland, Estonia, Latvia, Poland, Romania, Czech and Slovak Republic, Hungary and Western Russia continues to play a significant role in rural culture and the food economy. In highly industrialised Germany alone, 7-800 000 Roe Deer are harvested sustainably every year, with deer counts and forest impacts defined by hunting and forest authorities.

Recreational deer hunting is based on hunting territories (75 to several thousand ha) that are leased on a nine year basis from landowners (farmers, town councils, landowners, State forest) to private individuals or small groups of hunters. These hunters must complete extensive course work and examinations, and must obtain special police approval. Any miscarriage leads to the termination of the hunting licence (which must be renewed every year) and of gun ownership. Prices paid for hunting territories range from 5-10 DM per ha up to 50-80 DM. This annual lease (up to 10 000 DM for 100 ha) must be complemented by habitat improvement measures, fencing and agricultural damage compensation contributions of these habitats.

The harvest is set through harvest plans (sex and age specific) and must be fulfilled in order to satisfy deer control functions that are essential to sustainable forestry. Any hunter who fails to do so may lose his/her hunting lease. Recreational hunting in Germany, Austria, Poland, Slovakia Republic and Scandinavia is the most efficient way to control deer species and prevents billions of dollars of damage to commercial forestry (Kalchreuter, 1984; Bauer, 1990a, b).

Deer hunting tourism is an important source of foreign exchange income for most former Eastern Block countries. Before the break up of the Eastern Block these countries had effective hunting legislation and wildlife ecology that allowed the maintenance of large populations of wildlife including critical species such as wolf and Brown Bear that were hunted according to strictly controlled quota (Kustov, 1991).

4. RECREATIONAL HUNTING AS A MODERN GLOBAL LAND USE

The importance of hunting in any community depends on the diversity and abundance of prey species. In diverse tropical rainforest conditions hunting has always utilised the range of often small, species typical of this environment (Bauer; 1993). On the other hand, in cold and Arctic regions where no crops could be grown, hunting was the predominant land use, often concentrating on single or few species, all of them large ungulates or marine mammals, (bison, caribou, reindeer, saiga, beluga whale, seals). To hunt these species successfully humans often had to evolve nomadic cultures.

The forms of hunting carried out in modern societies in all parts of the world have become a mix of traditional local patterns, mixed with hunting preferences, often superimposed by invading cultures, all subject to change according to social structures, political systems and the influence of aggressive western civilisation. And in many parts of Asia and Africa present wildlife and conservation legislation developed under the 'guidance' of international aid has effectively made most traditional hunting illegal.

4.1 Contemporary Hunting Models

4.1.1 The developed world

The hunting community in Europe

Hunting remains an important and diverse tradition in all European countries. Once a guarded privilege of aristocracy, its role in contemporary Europe has changed. In France hunting is the right of every French citizen, a decision inextricably linked to the French revolution in 1789, and a comparatively low abundance of many game species. It is a traditional and important component of the Swiss direct democracy, as it is in Sweden. In Germany and Austria it is a highly regulated, productive and socially diverse form of recreation and traditional land use, while in Scotland and England it retains many lingering elements of a privileged pursuit of the land gentry. In most countries of Europe, hunting remains, to some extent, a privilege of wealth but still has most of its roots in traditional and rural

society. It is an important component of land ownership and it fulfils many intricate functions in the relationships between landowners and other social strata.

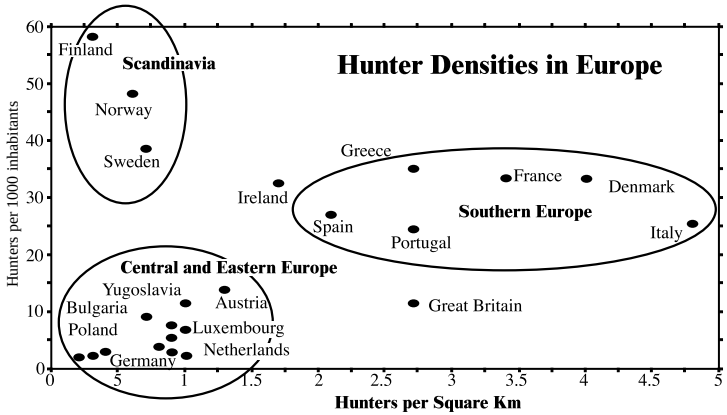
With increasing urbanisation, the emergence of the conservation movement and the merging of Europe, the role of hunting is being increasingly challenged. Hunters however have responded to this challenge. FACE, the European Hunting Commission, has started to play an important role in coordinating European hunters, addressing conflicts between national and European legislation, defining the hunters' image and coordinating research. The Game Conservancy in Great Britain, a respected ecological research and management body has been modelled in Germany. And finally, Ducks Unlimited in America, introduced as 'Euroducks' in Europe, has become a major force in reversing a trend for disastrous destruction of wetlands and loss in waterbirds over North America and in Europe.

Present day Europe is a hunting environment that has more diversity than any other region in the world. Several million ungulates are harvested every year, along with many million individuals of smaller species. Each country in Europe has its own political system, culture, history, language, conflicts and hunting traditions. For instance Great Britain still has hunting as primarily a recreational pursuit of the gentry, (at times highly disputed such as Fox-par force hunting) whereas France advocates the right of the 'citizen' to enjoy one of the fruits of the revolution. The Italians have an anarchic, vivacious enjoyment of the outdoors and of the slaughter of millions of songbirds migrating to Africa (after having been bred with a lot of effort in the bird breeding boxes in the north). Germany displays a Prussian like, efficient, tradition-laden hunting style, and the Scandinavian style is a rather laid back and natural way of enjoying the outdoors while providing a meat supply for a year by shooting a moose.

France has taken a lead in this trying to develop a system of hunting that is acceptable to all EEC members. FACE, the European Association of Hunters and CIC, the International Council for Game and Wildlife Conservation, both originally based in Paris, (CIC moved to Budapest in 1999) have become two powerful NGO's that have challenged conservation ideologies in many ways and have

increasingly established a tradition of research and discussion amongst hunters unheard of in the past. Both organisations are also full members of the World Conservation Union and cooperate closely with 'Wetlands International', a research/management body for water fowl with increasing political clout. The recent move of CIC's headquarters to Budapest however has made it clear that, increasingly, eastern European countries with their old hunting traditions and high standards of hunting legislation and research play an important role in the European hunting scene. This is also indicated by the large number of hunters hunting in the eastern parts of Europe, including GUS countries in Central Asia.

Figure 2: Hunter densities in European countries



There are three main hunting patterns in Europe (Figure 2) that generally fall into three distinct geographic regions, Scandinavia, southern Europe and Central and Eastern Europe:

1. Low hunter density, high hunting population rate (Scandinavia)

2. High hunting density, medium hunting population rate (Southern Europe)

3. Low hunter density, low hunting population rate (Central Europe)

All three generally correspond to differences in hunting legislation and land tenure.

Hunting in Canada

Canada, with its diversity and abundance of wild big game, is one of the world's most important countries for hunting tourism. The hunting of large carnivores (grizzly bear, wolf, black bear) and large herbivores (moose, caribou, wapiti, mule deer) in vast pristine boreal and alpine environments, often under the guidance of indigenous Indian and Inuit people, is, for most hunters, an unforgettable experience. Hunting and trapping fur bearing animals play a significant part in the Canadian economy (see also Case Study 1) and are an essential way of life for the majority of indigenous people. Much of the hunting has been for sustenance fur and trophies such as the large antlers of moose or bear skins. The Yukon Territory of Canada is an example of how hunting can dominate the economy of vast Canadian landscapes.

Case Study 8:
The Ultimate Hunting Experience - The Yukon Territory in Canada

Within the Yukon Territory in Canada with its almost 500,000km^2 size and only 32,000 inhabitants, hunting, with the virtual absence of agriculture due to cold temperatures, has been the only possible form of land use. Mining, important as it is, is plagued by dramatic market fluctuations. Nature Tourism has now become the most important land use.

SPECIES	POPULATION	INDIGENOUS HARVEST	TROPHY HARVEST
Caribou	280000	366	189
Moose	55000	478	225
Dall Sheep	21000	78	197
Black Bear	10000	72	19
Grizzly Bear	7000	34	59
Wolf	4500	88	25
Mountain Goat	2000	2	4
Forest Bison	320	5	1
Polar Bear	?	2	0
Musk Ox	150	0	0
Mule Deer	500	0	0
Wapit	120	0	0
White-tailed Deer	30	0	0
Puma	?	0	0

Musk ox in the Canadian North

400,000 visitors come into this wilderness each year between June and August for trekking, canoeing, birdwatching, fishing and hunting. Hunting tourism, attracting approximately 600 foreigners, primarily from USA and Europe (100 - 150 of them from German speaking countries in Europe) is an important component of this tourism. It employs 120-150 local people and contributes 4-5 million Canadian dollars to the local economy for the harvest of merely 700 animals within half a million square kilometres. Hunting is based on harvest quotas determined from population counts since 1972 and carried out by only 20 licensed concessionaires who control an area of 13,000km2 each (Hoefs, 1999).

Hoefs (1999) contributes the extremely high quality of this experience for hunters and the substantial boost they provide for the territory's economy to a number of factors such as:

1. Relatively little competition with native Indians
2. High diversity and abundance of Big Game animals
3. Very good legislation
4. Good relationship between the indigenous and white community

Hunting in the USA

'Our image of the traditional American hunter is clear cut. He was Boone and Crocket, Jed Smith and John Colter, a lean bronzed man in fringed leather and coonskin cap carrying a muzzleloader that never missed. He was an expert tracker and Indian fighter. He could find his way through a thousand miles of roadless wilderness without ever going hungry. He was uncomfortable in the 'settlements ' preferring to live beyond the reach of civilisation

where he could find a little 'elbow room'. There is a mythic edge to this heroic figure...but they also destroyed the land and lifestyle they loved....they turned hunting into an industry that consumed game and furbearers faster than they could renew themselves.....took an active role in land speculation...provided expert advise in almost two centuries of Indian wars .....whose sole purpose was to end the frontier way of life.

(Madson, C., 'Two Faces of Hunting', 1999)

The access to game and hunting is one of America's most guarded constitutional rights. Five to seven million US citizens exercise this right regularly either through access on public land, particularly state forests, or for the more wealthy and exclusive hunters, through paid access to private properties that have been developed for hunting. The developers of such properties have not hesitated to introduce and breed vast numbers of exotic game. Texas has become home for exotic ungulates (Texotics) that roam large farms in what can be vast herds. Texotics are primarily Indian game species (nilgai, blackbuck, chital) but also species such as the aoudad from Northern Africa (Teer, 1991). There is evidence that the latter compete with rare and regionally endangered Mountain sheep that have lost more than 90% of their original distribution and occur in many small and isolated colonies. Along with these more controversial moves to improve hunting (Teer, 1991) hunters have made very significant efforts in the US to replenish, reintroduce and re-establish depleted populations of native wildlife.

As in Europe, North America's white-tailed deer has responded extremely well to intensive agriculture and forestry, which are dominated often by patchy forest fragments within agricultural fields. This species is also the major game species. For permits to take rarer species such as pronghorn antelope, dall sheep and mountain goat, public ballots are held, which give a small number of lucky hunters access to these species. Very substantial amounts of money are currently raised for wildlife conservation and for game management from these ballots.

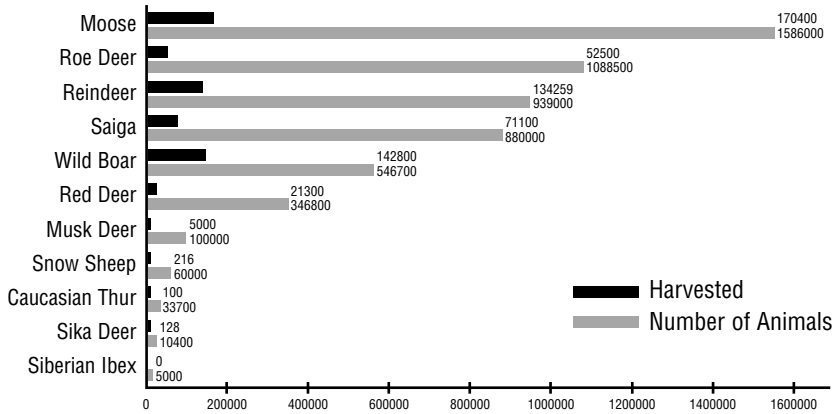
The predominance of hunters in the USA has led to a vast body of wildlife research which, surprisingly, has not significantly improved game management on the ground (Caughley, 1983). With increasing

urbanisation and large urban centres, however, there is increasing opposition to many forms of hunting (Madson, 1999).

Hunting in the former Eastern Block

Wild game and hunting play a very important role in the East European Countries, in particular the former USSR. The magnitude of the harvest of ungulates in the latter country is shown in Figure 3, which plots values of population numbers and harvest for the USSR given by Kuzjerkin (sighted in DJV handbook 1989). Game is taken commercially in the vast territories of USSR and now GUS by approximately 5 million hunters who are registered within a system of game management that used to employ 52,700 people. The intensity and sophistication of management of game resources in the former USSR and in Poland, Czechoslovakia, Romania and Hungary is achieved by few other places in the world. Extensive wildlife counts with sophisticated stratified and representative aerial census for many years have ensured a sustainable yield in the USSR. After the collapse of the former Soviet Union, lots of this has changed and hunting became less regulated and less sustainable.

Figure 3: Ungulate harvest in the former USSR (after Kuzjerkin, sighted in DJV handbook 1989)



4.1.2 The developing world

Africa
All through Anglo-Saxon literature Africa has had a particular fascination for the hunter. Trophy hunting of the big five (Lion, Elephant, Rhino, Buffalo, Leopard) was a pursuit of the very rich during the early parts of this century right through the 1960's. In the seventies and eighties the general decline of game (more often than not through political instability than trophy hunting) and the establishment of many national parks has strongly affected big game hunting. Over the last decade trophy hunting has again expanded and a serious attempt has been made to include it as a facet of nature conservation (Baker, 1997a,b; Baskin, 1994; IIED, 1994; Lewis and Alpert, 1994; Meier, 1989).

However, while Lewis and Alpert (1997) demonstrate the substantial benefits hunting can bring (e.g. to the Zambian economy), Baker (1997) in an analysis of hunting in the southern parts of Africa, concluded that a lack of appropriate monitoring and exceeding hunting quotas made sustainability doubtful. Additionally, corruption prevents communities from truly benefiting from hunting schemes in Tanzania and Botswana. Namibia, with its predominantly German administrative background, stands as an example where hunting is carried out based on private landownership. Numerous game farms rely on their hunting income in a significant way. This harvest encompasses approximately 22 species of wild ungulates (Meier, 1989). Using this example, Meier (1989) demonstrated that game utilisation provides a very substantial contribution to farm income and that trophy hunting is the superior land use on marginal land.

South America
Robinson and Redford (1991) give a comprehensive account of wildlife utilisation and hunting for South America. They argue that despite the large scale tropical deforestation that occurs in this region, there is a great dependency on wildlife products, particularly among indigenous people and peasants (Bodmer, 1995; Bodmer *et al*. 1997; Robinson and Redford, 1991; Vickers, 1991). At the same time there are many possibilities to develop this industry for value adding consumptive and non-consumptive tourism (Dallmeier, 1991; Groom

et al., 1991; Purdy and Tomlinson, 1991). There are several examples of this (e.g. of a trophy species industry in Argentina).

Asia

Asia has probably the world's most diverse game fauna, although cattle and antelopes showed higher radiation in Africa. Unlike Africa, however, Asia has had very high human populations for many years and has seen several highly developed civilisations that changed Asian landscapes over vast areas even in prehistoric times. Northern India and Nepal with their open monsoonal forests and savannah-type grasslands along vast floodplains have been renowned for their megafauna and diversity of ungulates and large predators (one-horned rhino, Asian elephant, gaur, Asian buffalo, nilgai, sambar deer, chital, swamp deer, blackbuck, tiger and sloth bear). In terms of biomass Asia was equalled only by the richest areas in Africa (Seidensticker, 1976). However, the region that was protected by malaria until the mid 1950's, has become heavily populated with only relatively small pristine areas remaining. These areas are mostly National Parks derived from hunting grounds of the Rajah's, such as Corbett and Kahna National Parks in India and Chitwan and Bardia National Parks in Nepal. Until recently, Nepal's protected areas in the south have been selectively hunted by the King for rhino and tiger, but now hunting activity has ceased. As far as can be ascertained even heavy hunting pressure on the tiger did not affect the population (Mishra, 1982; Laurie, 1978). Other threats such as tourism (Cosgriff, 1997) or hydro development (Bauer, 1995, 1997) have now become a national concern.

Conservation legislation introduced in many Asian countries has halted hunting. Lack of enforcement potential by local people and government authorities however cannot halt the continuing decline of many populations of ungulates. This can be seen in China, where vast populations of ungulates were decimated during the cultural revolution in the seventies and are still being depleted (Thwaites, Bauer and DeLacy, 1999). With the new tolerance of international conservation organisations to sustainable use and even trophy hunting (Shackleton, 1997) there is now modest interest by conservation authorities to explore new ways of consumptive utilisation of wildlife. Unfortunately for many areas local populations

of animals are too depleted to constitute a resource that can be sustainably utilised.

4.2 Conclusions - Global Comparison

The importance of hunting obviously differs for national economies. Developing countries such as Zambia derive more than 3.1 million US dollars from hunting, while places such as Kenya, which stopped in the seventies, derive no income from hunting (Baker, 1997; Alpert and Lewis, 1997).

Hunting plays a major economic role in highly developed and industrialised places such as the USA, Canada, Germany, France and Russia, while developing countries such as India, Nepal and Zambia derive very little economic benefit, although they have game and wildlife resources which are more diverse and at times more abundant than in developed nations. Australia is placed in a somewhat intermediate position. It derives very significant annual income from the kangaroo meat industry (AUS$280 million), while the value of the deer hunting industry is estimated at around 70 million AUS dollars per year.

Hunting can be maintained and can be productive, as the previous examples of developed nations displays. It also shows that it can play a very significant role in the national economy.

5. TROPHY HUNTING

The collection of hunting trophies is an expensive pursuit of a considerable number of hunters, especially in North America and Europe. Trophy hunting performance is measured in the Index value (derived by specific formulas) of length, width and circumference measurements of either teeth (Candids, Elephant) or head protuberances (Rhino horn, antlers and horns). Hunters have gone to considerable intellectual and statistical time to produce formulas, guidelines and books to classify these trophies into Bronze, Silver and Gold medals (Whitehead, 1986). In past and present, trophy hunting has aroused many emotions and led to many conflicts (Kalchreuter, 1984; Bauer, 1993) between the hunting and anti-hunting factions of society. Generally for the majority of people the Olympic chase for milliseconds, millimetres and points is the name of the game, while it borders at perversion, not for a few of them, to apply this principle to trophies. Like in any other sports, hunting follows rules that may be very defined in countries like Germany, Poland or Austria, maintained by strict and difficult hunting examinations (which require, as is the case in Germany, a considerable amount of biological and natural knowledge). However, it may be subject to few rules in countries with little or no hunting history.

5.1 What Are Trophies?

1. *Anything taken in war, hunting, competition, etc. esp. when preserved as a memento, spoil or award.*

2. *Anything serving as a token of victory, valour or skill etc.*

Dictionary Random House

Figure 4: Examples of Animal Trophies

TROPHY TYPE	ANIMAL SPECIES
Antlers	Deer
Horns	Cattle, Sheep, Goats
Teeth	Lion, Walrus, Elephant
Feathers	Grouse
Skins and Furs	Predators
Nose Protuberances	Rhinoceros
Penises	Bear, Walrus
Full Mount	All animals

In general it is difficult to classify hunters as trophy hunters. For most traditional hunters, trophies (Figure 4) rather than the ultimate aim, are a welcome and additional benefit that can serve as a memento of a particular experience, or as a proof of the skill of the hunter.

In our analysis of hunting tourism destinations, expenses and animal diversity we have identified four categories of trophy hunters. These categories are tentative and not distinctly separated. Rather, individual hunters might display various characteristics. Still they are probably mainly separated by a willingness to pay:

1. Facultative Trophy Pursuit

2. Preferential Trophy Pursuit

3. Collector Trophy Pursuit

4. Elitist Trophy Collector Pursuit

5.2 Modern Exclusive And Non-Exclusive Trophy Hunting

Trophy hunting remains an exclusive form of recreation and tourism in which the participant is willing to invest a large amount of time, effort and money. The media often portrays trophy hunting as the focused pursuit of the large trophy. Hunters however, rarely fit this description. There are various degrees of importance attached to trophies by the

hunter. For the sustenance traditional deer hunter in Europe, trophy animals generally constitute less than 20% of the total kill each year that must be maintained (for control purposes) in a highly selective fashion (age, sex) in order to maintain one's hunting rights. Similarly for the moose hunter in Scandinavia who goes out once a year to obtain a moose for consumption, a good trophy is something desirable but not essential for the kill. In this form of non-exclusive trophy hunting a trophy remains secondary to the hunting experience and the desire for meat and is just an additional bonus enhancing the recreational value of the hunt and obtaining a memorabilia to celebrate this hunt. Many Victorian sambar deer hunters for example, fit into this cast of taking and appreciate good trophies opportunistically.

The exclusive hunt for trophies is most firmly entrenched in the hunter who does not have much time to invest in his/her pursuit and who wants to enhance the value of a short-time experience by retaining something which either gives exceptional memory and/or status.

The importance of status in competitive trophy hunting is probably an aspect that leaves trophy hunting most open to criticism. Hunters, just as other sportsmen, have the desire to excel and unfortunately this desire can take forms which not only make it less acceptable to the general public but which also raise questions as to the relationship of trophy hunting with conservation.

5.3 Competition

SCI (Safari Club International) programs include 29 hunting achievement awards, labelled as either 'Grand Slams' or ' Inner Circles', that appeal to the wealthy hunter's zest for one-upmanship and keep the industry well financed. For example, to achieve the ' Africa Big Five Grand Slam' a hunter must kill an African lion, leopard, elephant, rhinoceros and Cape buffalo. To achieve a 'Bears of the World' Grand Slam, a hunter must kill at least four different kinds of bears, among polar bears, Alaska brown bears, grizzly bears, Eurasian brown bears, Siberian brown bears and others. The inner circles are even more difficult to achieve, and have five levels; to claim the highest,' Diamond level, a hunter must kill 76 different species. For a hunter to collect all of

the SCI's 29 hunting awards, he or she would have to kill a minimum of 322 different species or subspecies

Pacelle (1999a) Vice President of the 'Humane Society of the United States'

Trophy hunting is a form of recreation that offers a unique sense of adventure, risk taking, diversity and hunter status. It is also an exclusive and expense and that has made contemporary trophy hunting a status symbol amongst the rich. One example of this exclusive recreation has been operating in the mountains of Austria and Bavaria for centuries and has generated significant benefits to local communities. While remaining sustainable (see Case Study 9).

Case Study 9:
Trophy Hunting in remote mountain areas of Austria

The mountains of Austria and Bavaria as little as a hundred years ago, had all the major characteristics of remote mountain valleys in Nepal (Bauer, 1999). Low income, little infrastructure, no transport, high annual male labour migration and high emigration rates excluded these areas for many years from development. Mountain tourism, in particular skiing, has made these marginal areas in Austria affluent, however only at accessible locations. Many regions and high altitude valleys remain remote and under-developed, additionally hit by the agricultural crisis in particular dairy products, the major seasonal industry (Almwirtschaft).

In these areas however hunting blocks are leased for significant sums of money (several hundred thousand US dollars per annum) for large blocks (5-10 000 ha), with large populations of Red Deer and Chamois, mostly to German and Swiss industrialists. The passing tourist who is going for a mountain hike is only in autumn aware of this exclusive circle. A member of which might pass the hiker in an expensive four wheel drive with hunting racks sporting a little fortune of hand-made rifles on the way to their hunting residence. (often ancient, modest, yet internally modernised farmhouses). While the average tourist however leaves little more than a few dollars on a brief visit, the leased hunting block employs several professional hunters (whose families constitute in some valleys the majority of the population) and contributes large sums of money to the local economy. This includes the farmers who lease their farmland as cooperative hunting blocks. The industrialist's expectation of the experience is a brief annual visit with friends and family to hunt for several large red deer stags during the mating season (rut) when the valleys at night reverberate from Red deer calls (roar). They possibly hunt for status but also for enjoyment of a primal experience in a pristine magnificent mountain setting. The game keeper plays an important role in the local community, is a repository of ancient hunting stories and traditions and culls non-trophy animals which constitute more than 90% of the total kill and supply an important export good. The reduction and control of deer and chamois in upper alpine zones, which are no longer regulated by large predators such as Wolf, Lynx and European Brown Bear, is also essential for the regeneration of mountain forests, the prevention of snow avalanches and the general catchment health.

For the overall economy of Austria this form of exclusive trophy hunting might be of little significance. For remote regions, mostly run on a seasonal basis, far from roads, fancy skiing resorts and casinos, trophy hunting remains the single most important factor in maintaining Austria's distinct mountain culture. It generates employment, significant income, monitoring and maintenance of the environment, wildlife and forests during winter. While exclusive and elitist in its very nature this type of trophy hunting could be well suited for many other remote locations in the world, including Australia and New Zealand.

5.4 The International Trophy Industry

The majority of European trophy hunters prefer to hunt in their home territory where they are familiar with the terrain and have an intimate knowledge of the local animals and their behaviour. An increasing number of hunters, however, seek the exceptional experience. This

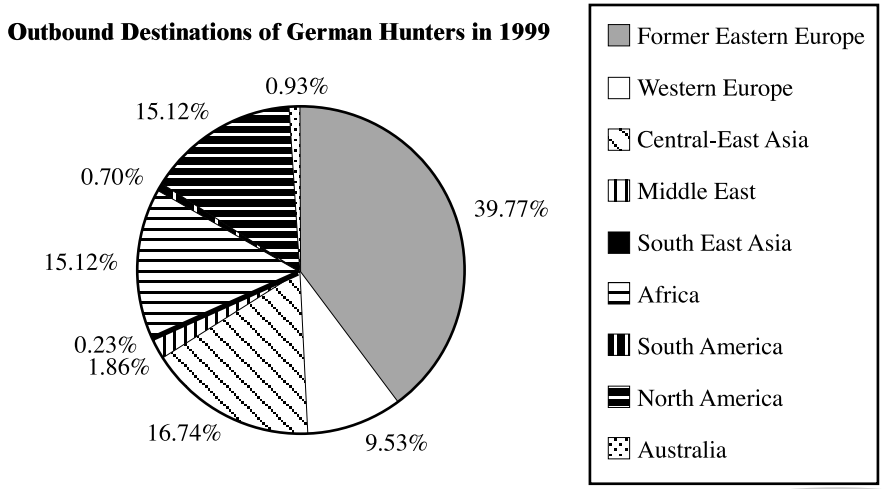
experience may include hunts for large game in remote and wild regions of the world.

The pattern of this industry is revealed by the frequency of species, destinations and country characteristics in advertisements of hunting trips by the outfitter industry in Germany. Advertisements in Germany are representative of a powerful, highly organised and economically viable group of hunters who make annual hunting trips for which they pay up to 100,000 DM per year to supplement their experiences with their domestic and highly regulated hunting territories. The analysis assumes a close relationship between countries and species advertised and the destination, and hunter's choice of species. Actual preferences could only be determined by contrasting advertisements with actual hunting selections.

5.4.1 Outbound destinations

Figure 5 shows the outbound destinations for 437 advertisements in a German Hunting Journal 'Die Pirsch' in 1999. Almost 40% of the advertisements offer hunting trips, to the former East Block.

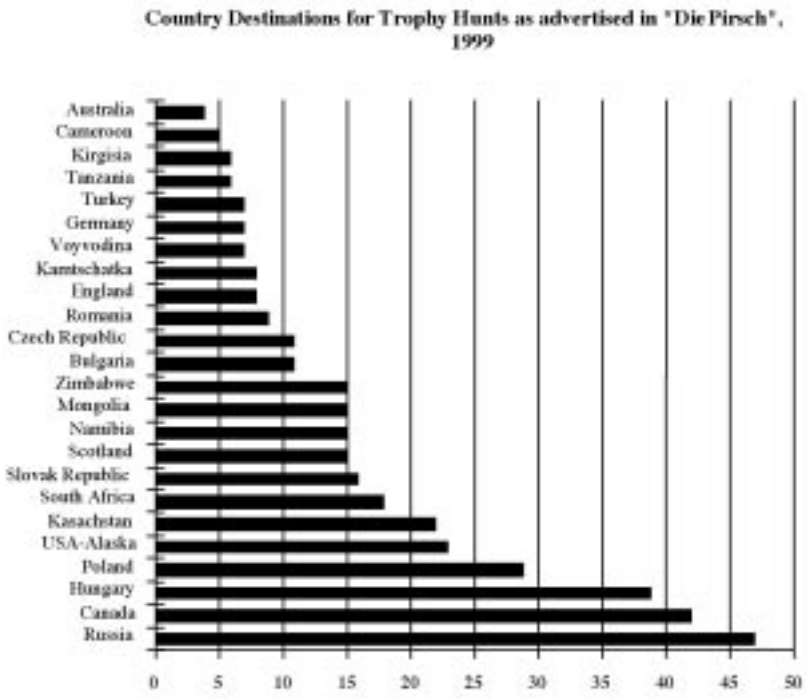
Figure 5: Outbound destinations of German hunters in 1999 (sampled from all special issues as 'Die Pirsch'; N=437).



5.4.2 Country destinations

A frequency distribution of country destinations (Figure 6) shows the predominant position of a small number of countries, in particular Russia, Canada, Hungary and Poland. In Russia and Canada it is the attraction of large bear and large Cervids, which draws the hunter's interest, while the remaining countries attract interest for a whole range of species. The experience of an exotic country is at least as important. It is notable that Australia occupies the last place of the 25 major destinations, although it offers a wide range of game species.

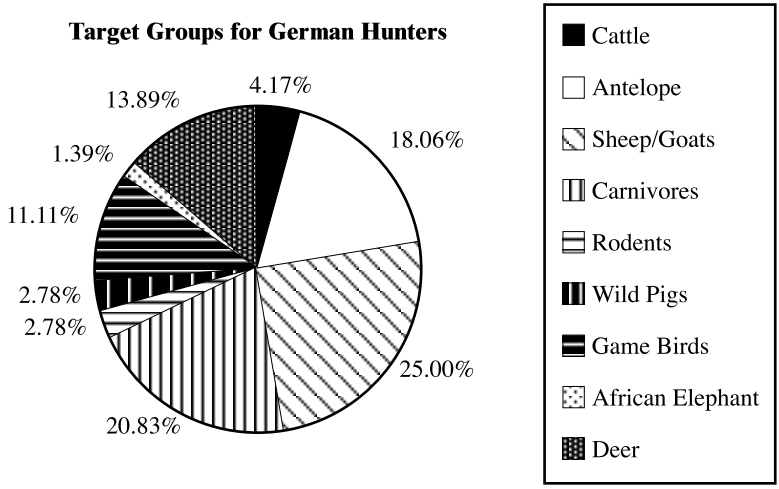
Figure 6: Country destinations for Trophy Hunts as advertised in 'Die Pirsch', 1999, N = 437).



5.4.3 Animal target groups

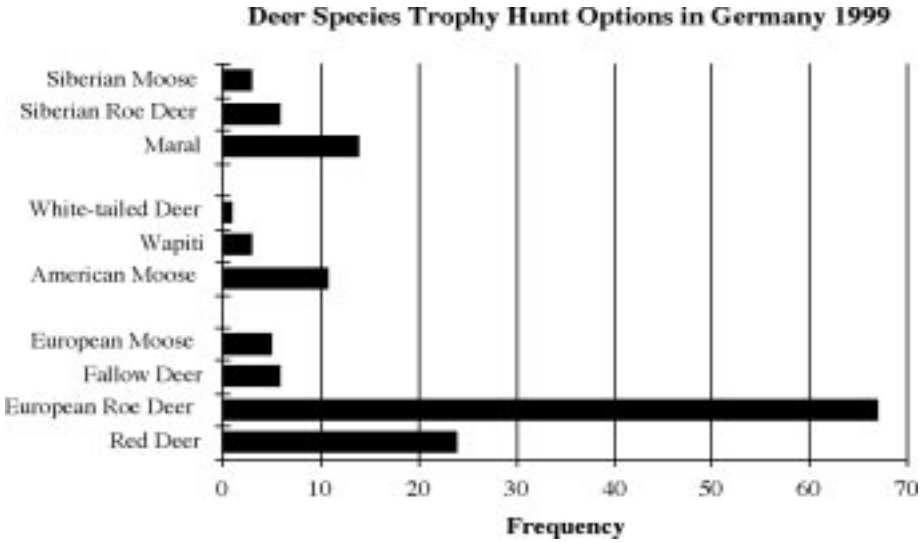
Cervids and bovids, both of them in possession of often large and prominent horns/antlers, form almost half of the prey offered to the German hunter (Figure 7).

Figure 7: Taxonomic groups of animals offered to the German hunter in 1997 (N=437)



For the preferential trophy, deer, German hunters have a choice between 10 different species of deer. It is not surprising that the two most frequently advertised species, roe deer and red deer, are also the two species that are the predominant trophy target in Germany (Figure 8).

Figure 8: Deer species trophy of hunting options in Germany as advertised in special issue of 'Die Pirsch', N=437).



5.5 Conflicts For Trophy Hunters

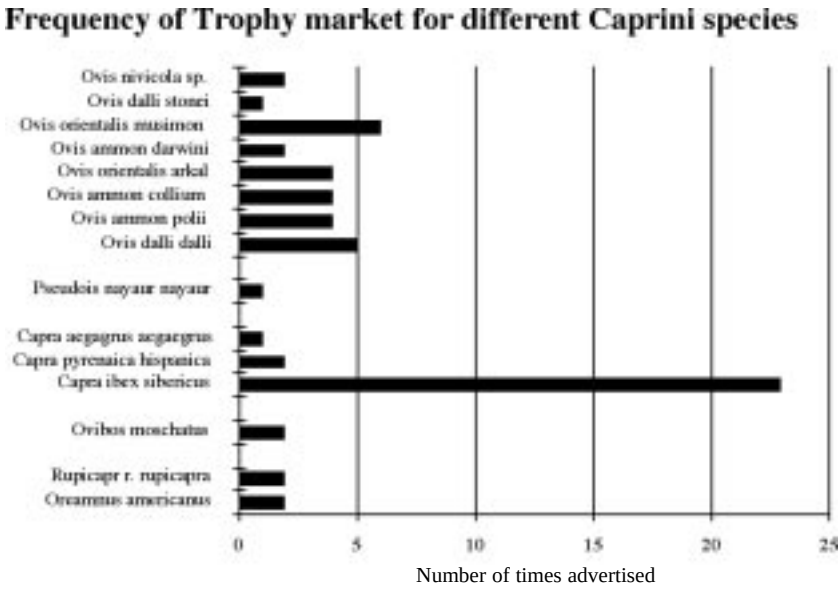
As any serious collector knows, collecting can evolve from a hobby to an obsession. Safari Club International has set trophy targets for ultimate trophy hunter prizes that have generally not encouraged conservationist and animal right groups to endorse hunting as a legitimate means of conservation. Pacelle (1999) in an emotional yet essentially accurate attack on renowned members of SCI and the Smithsonian Institution exposes some of the more disturbing aspects of this competitive game. As in art collections however it would be ludicrous to assume that every collector has these tendencies (see also A. Leopold, 1933).

5.5.1 Caprinae trophy hunting analysis

Wild sheep and goats are particularly interesting groups of trophy animals. They range over vast areas in the world and are the only group of medium sized animals that have adapted to extreme

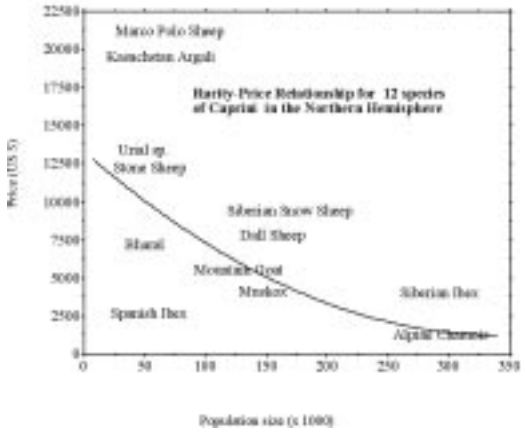
mountain conditions (Bauer, 1990). As a taxonomic group they are very diverse (25 species, 100 subspecies, (Shackleton, 1997)) and have become the most sought after and highly prized group of animals on the list of hunters (see Figure 9). In the analysis of recent hunting preferences (Die Pirsch, 1999) 15 taxonomic units (11 species and 4 subspecies) or almost 40% of the world's species/subspecies were hunted. A recent review by the IUCN Caprinae Specialist Group (Shackleton, 1997) has identified approximately 70% as either vulnerable, endangered or critical.

Figure 9: Species of Caprinae advertised by ' Die Pirsch' in 1999, including several endangered species



Advertised Trophy prices for wild sheep ranged from little more than US$500 to US$22,500. The highest known price ever was offered for an Argali ram in China in 1999. An American hunter offered US$49,000 for one animal (P. Wegge, pers. Comm. 2000).

Figure 10: Rarity – Price relationships for 12 species of wild sheep in the Northern Hemisphere (as determined for 437, advertised in a 1999 issue of 'Die Pirsch').



In Figure 10 we have plotted the relationship between population size (x axis) and market price of the Caprini advertised in 'Die Pirsch' in 1999. For the conservation ecologist it is disturbing to see that abundance is negatively correlated with price.

6. HUNTING AND MODERN SOCIETY

6.1 A Social Profile Of The Hunter

It is not easy to classify hunters, as very different motivations govern their behaviour. We have suggested earlier, that many aspects of hunting contain several elements (indigenous, traditional, recreational, control and commercial). In a recent paper on the attitudes of hunters in America, Madson (1999) distinguished two major types, which are typical for USA and hold to some extent in other countries:

1. **Classic frontiersman-subsistence hunter**

2. **Gentry sport hunters**

It is obvious that these two types contain an element of class distinction that may be defined below:

1. **Classic frontiersman-subsistence hunter**
   The frontiersmen embodying the classic heroic and solitary attributes of the utterly independent, masculine master of bushcraft, marksmanship and survival skills (see also p26).

2. **Gentry sport hunters**
   Patricians, men of wealth and education who pursued game for 'sport'. This group spends large amounts of money on fine firearms and carefully bred hunting dogs. They dress extravagantly and fittingly for a day in the field. A member of this elite in the USA was George Roosevelt. Born into an old and patrician family in New York, Roosevelt was promoted quickly in political circles. His influence in the conservation movement is famous. Fewer people appreciate the depth of his interest in hunting and natural history (based on Madson, 1999).

Both types of hunters existed side by side for a long time, however it was the latter group which made not only hunting a sport but also laid the foundations for the modern conservation movement. Wealthy men hunting for pleasure rather than profit or meat eventually

changed their views of hunting. Roosevelt articulated the view of many of his compatriots in the USA when he railed against 'the swinish game butchers who hunt for hides and not for sport or actual food and who murder the gravid doe and the spotted fawn with as little hesitation as they would kill a buck of ten points'. The consequence was a change in the activity itself and the sporting community began to restrain itself. Sport hunters started to concentrate on the pursuit of exceptional trophies rather than exceptional numbers of carcasses and the community at large began to press for effective closed seasons, bag limits and game reserves.

In contrast to the USA, European hunting remains an activity that contains many traditional, recreational, subsistence and commercial elements and is closely tied to landownership.

6.2 Hunting And The General Public

In many countries, hunters represent a considerable fraction of the general public and are politically powerful. In democratic societies hunters also have the right to exercise their sport/profession as long as this activity is in the interest of this society and does not give any harm to fellow citizens. It is up to the hunters to demonstrate they can handle firearms safely and act in the interest of the community. As an example, in Germany, opinion polls gave a very high positive rating from the general public, despite the disclosures of many conflicts between hunters and conservationists. Similar results were also received recently with a comparable poll in Belgium.

Attitudes of the General Public in Germany towards hunting in 1989

Wildlife today requires control by hunters	69%
Hunters have to regulate species that tend to have population eruptions because of the lack of predators	82%
Hunters do not hunt because they like killing	82%

Hunters have to demonstrate their ability and suitability to hunt through examinations	92%
Hunting is part of the human heritage and will persist In the future	86%
Hunters do not go hunting to show off a trophy	70%
Hunters are conservationists	75%
Hunters spend more time for habitat and species protection than for killing animals	72%

Source: Sample Institute, Moelln, 1989, DJV Handbook

6.3 Hunting And Animal Rights

'We may never know why certain people take pleasure in what others condemn, one thing is sure: both hunting and protest against it are symbolic activities that will continue as long as there are humans and animals'.

(Cartmill, 1993)

The Case study in chapter one describes the collapse of the fur Industry through animal right movements originating in urban centres of Europe and the US. As it later turned out the collapse of this industry had several very severe repercussions, which are still major issues in conservation and in the rights of indigenous people. No matter what animal right concerns aim for, they will always target primary industries and indigenous and rural people. All three are becoming more and more disadvantaged in the modern world, where legislation is aimed at majorities not marginal people. The establishment of the Technical Committee for Humane Trapping by the International Standardisation Organisation (ISO) has, at least in its early stages successfully incorporated the viewpoints and rights of indigenous people, of representatives of the animal right movement, and of technical experts. This approach has clearly chosen an inclusive

and democratic way, instead of ramming something home, which is not shared by many other people.

Another very serious concern is of an ecological nature. There is much evidence that the eruption of populations of Red Fox, both in Europe and in Australia has been at least partly caused by the collapse of the fur industry and the much-reduced hunting pressure on fox populations. In Europe and Australia this decline has become a major threat to many endangered species, which are not able to adjust to yet another adverse factor. In this case an animal right approach might have benefited foxes, at the expense of a great many endangered populations and species. No ecologists would agree with that.

It would therefore seem, that in a society such as Australia, where an increasing marginalisation of indigenous people and rural people is currently a great issue and where the threat of exotic species and of native species which have become unbalanced (e.g. the Grey and Red Kangaroo) cannot be compared to any other country, particularly not the UK, just solutions demand a technical and informed rather than emotional and uninformed basis.

The debate on animal rights, particularly in the US and Northern Europe (Cartmill, 1993) has, for a long time, targeted hunting as a human activity in violation of animal rights. While many members of animal rights organisations accept the rights of indigenous people to exercise hunting or even tolerate commercial killing (slaughterhouses and hunting) there is a wide gap between these groups and people who 'kill for sport', in particular trophy hunters and duck hunters (Kalchreuter, 1989). Schuller (1999) in her PhD thesis entitled 'Killing for Sport ' has reviewed and analysed a wide range of opinions, beliefs and disputes amongst those who 'take pleasure in what others condemn' as Cartmill (1993) put it. While this research has investigated the psychological, ethical and cultural arguments of 'those who condemn' in detailed depth, the emotional involvement and the superficial treatment of the side of the ones 'who take pleasure' validates Cartmill's (1993) claim.

Another aspect of my professional life which reinforces the concept of empathy concerns the feelings aroused in the act of killing. For three years I worked in large export abattoirs around Australia where up to a thousand animals might be killed in a day. Having also killed many animals myself I find it difficult to talk coolly and objectively about the 'taking of life' as hunters, and philosophers, seem able to do. Life, any life, seems much more significant when faced with the task of forcefully removing it. Of course when you shoot from 50 metres like a hunter it is possible to escape the significance of killing and I suppose that this distancing from the act is part of the reason why many hunters can continue to enjoy their sport. However, when you must kill an animal that is warm to the touch, that may or may not offer any form of resistance, you are no longer a bystander but an immediate participant in the death. If the method is instantaneous the transition from alive to dead is almost imperceptible. If not, it is surprising how tenaciously an animal clings to life, not always in a defiant struggle, but in the slow extirpation of each vital sign. The final gasp or shudder may occur long after you think that life has ended. In these circumstances it is hard not to believe that in killing you have wrested something from this animal against its will and that what you have done is as significant as it is irrevocable. I am always left with feelings, and what they represent that I cannot countenance the killing of animals for such trivial purposes as sport. Not only do I reject recreational hunting but I also reject any ethical theory which cannot accommodate or pay tribute to those sentiments which are the best part of us, our humanity.

(Schuller, 1999).

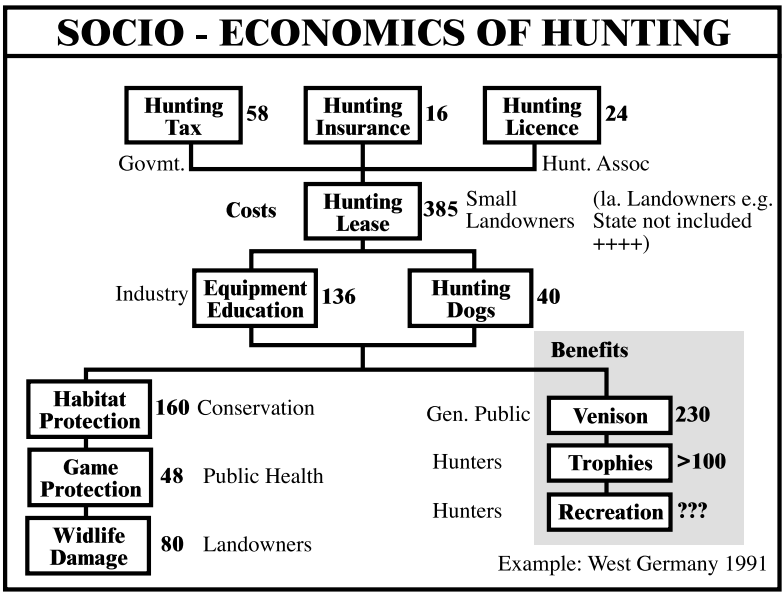
6.4 Economics Of Hunting

Unlike agriculture, hunting generally derives income or profit without major capital investment. A farmer will have to plough, fertilise, irrigate, and apply pesticides in order to derive income from his capital investment. All a hunter needs is a means to harvest the animal, generally a firearm and access to suitable species and hunting grounds.

6.4.1 Economic benefits

Economics of hunting in Europe - Germany as an example
The contribution of hunting to a nation's economy is demonstrated for Germany in Figure 11 (as compiled from DJV Handbook, 1991). It is evident that, apart from a considerable tax revenue going to the government, there are very significant profits for a diverse industry and more than 250 million DM for conservation and public health.

Figure 11: Socio-economics of hunting in Western Germany 1991 (figures in million DM, as calculated from DJV Handbook, 1991)



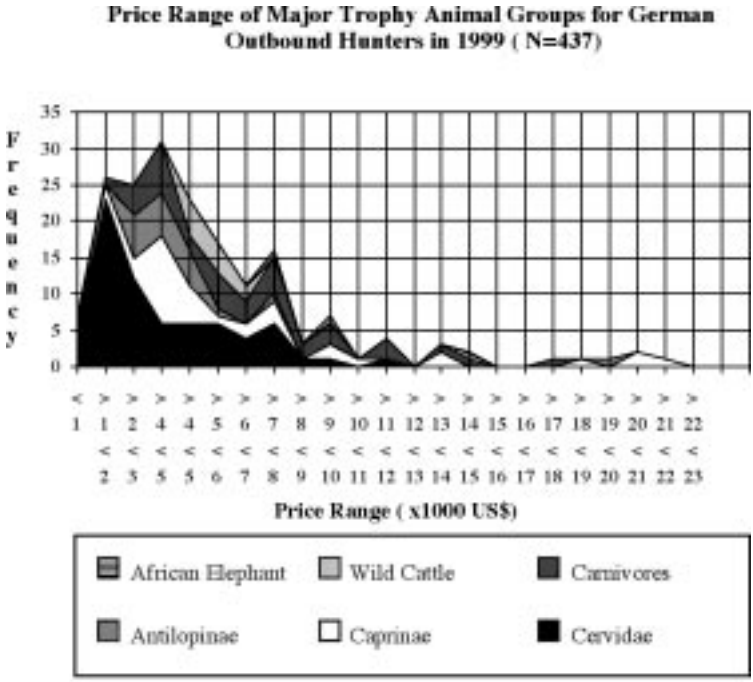
Economic benefits of hunting in USA
A recent survey of 2000 randomly selected Safari Club International (SCI) members found that the average hunter will spend 36 days and from US$2,000 to US$5,000 every year on hunting trips. He/she will spend an additional US$5000 on airfares, vehicles, guns and other equipment in order to go hunting. The average hunter will also spend US$1,267 a year on conservation programs that directly benefit wildlife (Roberts, 1994). If this figure is extrapolated to 14 million active recreational hunters in the USA, where they were taken, it reveals a staggering US$28-70 billion spent on hunting by hunters and an additional US$17 billion spent for conservation.

Hunting revenues in third world countries
Some relatively recent figures are available for hunting revenues in Africa. Makombe (1993) estimated that more than 6,250 hunters visited South Africa every year supporting an industry of $US69.3 million annually. The same author gives revealing comparative figures for Tanzania, Africa. This country's total revenue derived from tourists visiting national parks was $US1.9 million. In comparison the Tanzanian safari industry generated $US4.5 million in licence fees alone. The revenue generated from subsistence hunting in the developing world is substantial and crucial for many communities but poorly known (Alvard *et al*. 1997; Chatwick, 1995; Collins et al., 1997).

6.4.2 The trophy market

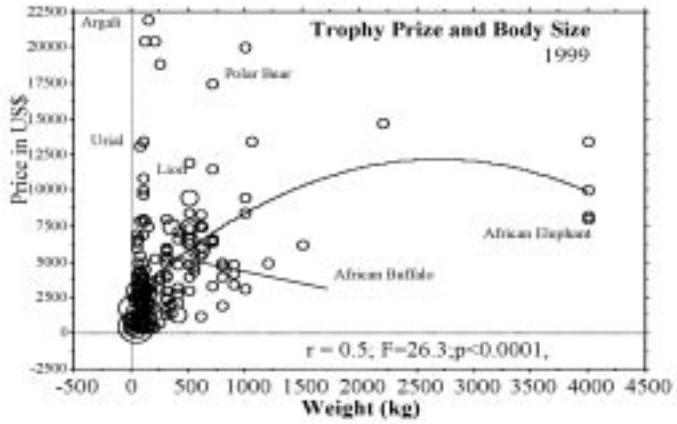
Trophy animals advertised for hunting in the German journal 'Die Pirsch' in 1999 ranged between US$500 and US$22,500 per trophy, excluding travel expenses to the destination, but generally including licence fees, guiding and accommodation (Figure 12). The cost for the processing of trophies, a significant and growing industry in Europe and the USA, was not included. 'Full Mounts' of exotic animals can cost several thousand US dollars.

Figure 12: Range of trophy animals offered on the German trophy market in 1991



There is no clear indication of what determines the price of the trophy, however criteria seem to be the size of the animal and trophy (Figure 13), rareness of the animal and type of animals, with wild sheep, large carnivores and deer leading the list.

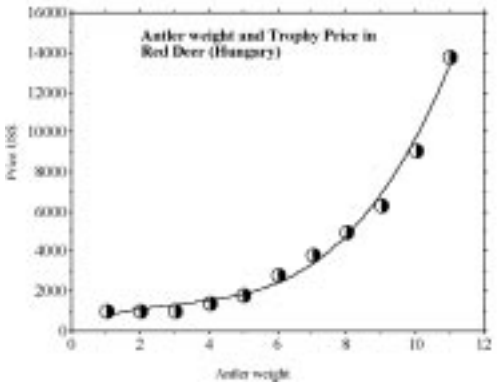
Figure 13: Relationship between trophy size and trophy price



6.4.3 Optimisation potential for trophies

Trophy hunting adds value to wildlife over meat hunting and trophy value can be much greater than meat value. Figure 14 shows the exponential increase in value of an animal approaching its optimal trophy size. Anything beyond 12 or even 13 kg for red deer represents the upper physiological limit of growth of this particular species. An example in practice can be seen in the Quality Deer Management programs for red deer in Hungary.

Figure 14: The relationship between antler weight and the animal trophy value for red deer in Hungary (MAVAD, 1984)



7. REGULATION OF HUNTING

The way we looked after animals in the past was different from today. A person could never kill an animal without informing the chief. A person who killed an animal would give the hind legs, rib cage and internal organs to the chief. And no one but the chief could hunt eland, which was hunted only once a year. Anyone who killed an eland committed an offence. Nowadays it is different. Anyone can kill an eland. Long ago this was not so.

(Chief Shikabeta, Traditional ruler, Luano Valley, Zambia, cited in IIED, 1994)

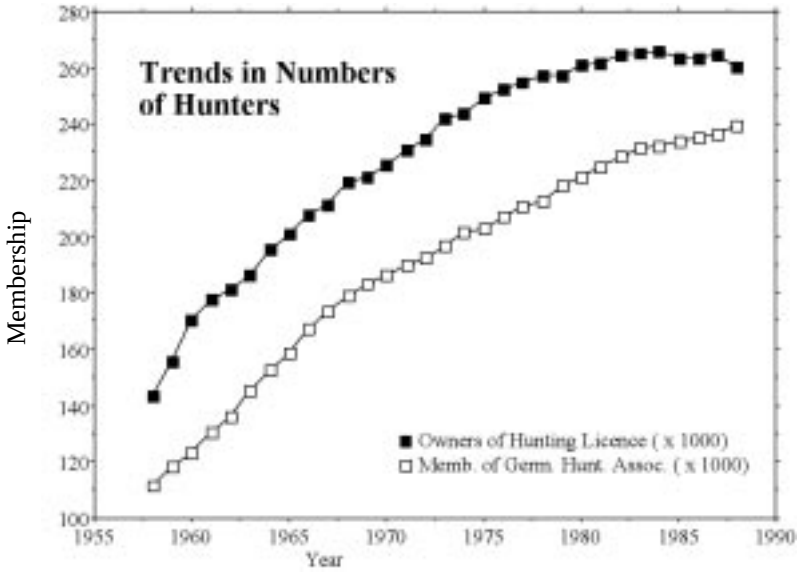
7.1 Hunting Legislation

The taking of Game is governed in various ways in different countries. In most central European countries hunting is closely linked to land ownership. For example, in Germany a landowner has to own at least 75 ha of land to be able to hunt on this land. As many farmers have less land, they have generally joined together to sell hunting rights to private individuals or small groups of hunters.

7.2 Organisational Structure Of Hunting

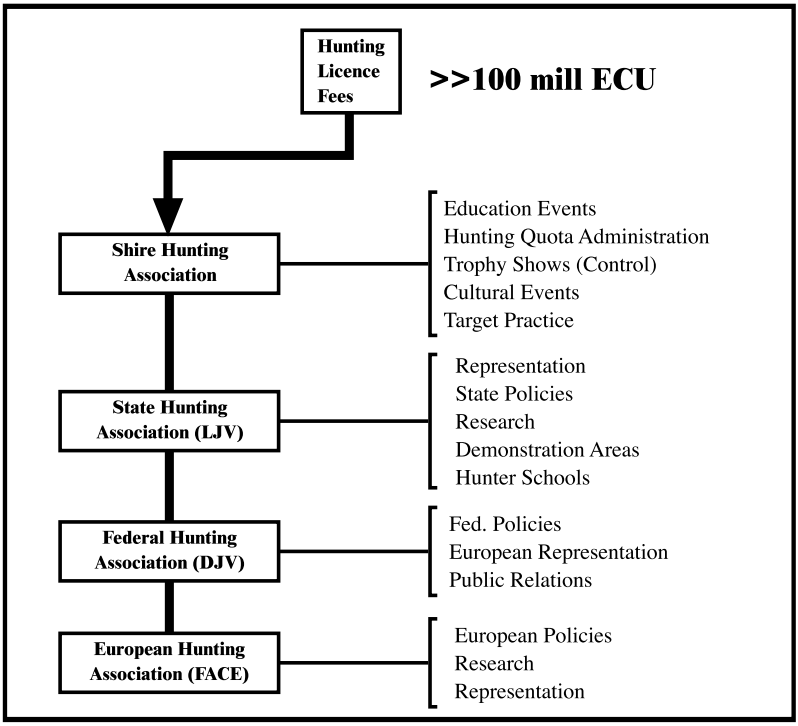
While hunting tends to be a solitary sport, hunters have developed organisational structures for many years. The relationship in Germany between numbers of licensed hunters and membership of hunters' organisations is shown in Figure 15.

Figure 15: Number of hunters and DJV (Deutscher Jagdschutzverband) membership in Germany between 1957-1987) (after Wiese, 1991)



The organisational structure of hunting in Europe has been developing rapidly during the past 20 years and now most of the national hunting bodies are contained within one European Organisation which represents around 7 million hunters. In Australia membership of hunting or shooting organisation is now strongly supported by government through firearms licensing legislation. In the past, however, apart from Victoria which has a long history of waterfowl and deer hunting, and traditionally strong organisational membership, hunting organisations attracted a much lower proportion of active hunters than in Europe.

Figure 16: Structure of game management bodies in Europe



7.3 Hunting And Research

Hunters in North America and Europe have made an invaluable contribution to research over many years and many textbooks on population management, game management and population ecology would not have been possible without the active cooperation of hunters (e.g. Caughley, 1977; Caughley and Sinclair, 1994; Kalchreuter, 1989, 1990). The skill of hunting depends to a great extent on nature observation and on the ability to combine clues and to understand the animal. This is exactly what wildlife ecologists do. The main difference is that the biologist has been taught how to combine and analyse these skills in an objective and repeatable fashion, while hunters do the same more or less successfully in an intuitive fashion.

7.3.1 Hunter-conservation conflict as research driver

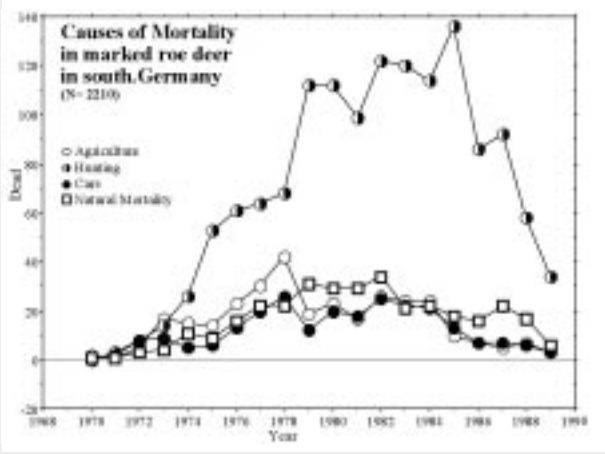
Hunters increasingly promote and participate in research, for example, collecting valuable data in waterbird banding projects and often returning a majority of the marking bands (Kalchreuter 1990).

Their participation is important in numerous ways, for instance in the development of better hunting policies or in clarifying conflicting issues that may exist between conservationists and foresters. The conflict between hunters and conservationists in Europe about hunting avian predators, in particular the Goshawk, has promoted our understanding of predator-prey interactions. Both opposing parties in order to clarify the issue have invested large amounts of money in research.

Long-term population studies
Long term population studies are an essential requirement in understanding the dynamics of animal populations. Hunters in many countries have been actively involved in monitoring operations for several decades. The Baden Wuerttemberg roe deer marking program in Southern Germany may serve as an example of long-term hunter commitment which has changed our understanding of roe deer management (Case Study 10) (Bauer, 1990; Bauer & Strohhaecker, 1988; Bauer & Linn, 1993a,b,c,).

Case Study 10:
Mark-Recapture Studies Long-term on Roe Deer Population Ecology by Baden Wuerttemberg Hunters in Germany (1965-2000)

This long-term roe deer research project, carried out by approximately 300 hunters in Baden Wuerttemberg is now coordinated by the Baden-Wuerttemberg Wildlife Institute and supported by the Landesjagverband, Stuttgart. Over approx. 35 years more than 15,000 Roe deer have been marked by hunters shortly after birth. Approximately 3000-4000 of the marked animals have been returned and recorded in a database. These records have given invaluable insights into population dynamics (longevity, sex specific mortality, fecundity, season of births) of roe deer and provided a long term monitoring tool which is invaluable for sustainable yield management.



Causes of mortality in roe deer between 1970-1989 as identified in a hunter mark-recapture program (Bauer, 1991).

Case Study 11:
The Caprinae Questionnaire

The year 1997 will go down as an important year in the history of humankind and of sheep. Some scientists from the UK have managed to clone a sheep. It was a very important year for sheep for another reason. The Species Survival Commission of IUCN, Caprinae Specialist Group has produced a report it had been working on for five years regarding the status and survival of 100 subspecies of 25 species of wild sheep. The report states that many of these populations are isolated and on the brink of extinction. Many of them have disappeared. One of the species, the Argali or Giant Sheep weighs more than a quarter of a tonne and can withstand temperatures of more than - 50 degrees C.

At the same time hunters and scientist from the Europe based CIC (International Council for Wildlife and Game Conservation) have produced their own status assessment for the Caprinae (Franco, Ed.) in close cooperation with IUCN. This group, after a meeting in Reno in 1990, also developed (in cooperation with Safari Club International) a Caprinae Questionnaire (Bauer, 1990). The CIC requests any hunter hunting wild sheep in Asia to carry a questionnaire and fill it out after the hunt in order to improve the very scant knowledge on the distribution of this group of animals.

7.4 Hunting, Integrated Conservation And Development

7.4.1 Hunting as a conservation tool

Wildlife utilisation and in particular trophy hunting (Pacelle, 1999), remains one of the most controversial issues in the conservation debate. During the past ten years, however, conservationists and ecologists have markedly relaxed their opposition on hunting, and acknowledge it as a potentially important conservation tool (Kalchreuter, 1989; Grigg, 1995; Bauer; 1993, 1999, Webb, 1995; Borrallho, 1995; Caro *et al*, 1998a,b, Caro, 1984; Coppinger, 1994; Sandor, 1997; Dals and Alpert, 1994; Davies, 1996; Heppold, 1995; Hertog and Hofluenn, 1977; Jackson, 1994; Kelso, 1993; King, 1991). This even applies to trophy hunting.

There is accumulating evidence that trophy hunting, if regulated well and based on sound population data, can generate much income for rural and disadvantaged areas (Bauer, 1993; Maier, 1988) while having only modest impact on wildlife populations (Bauer, 1990a,b, 1986). Equally, however trophy hunting schemes can have detrimental impacts on populations (Geist, 1988; Ginsberg & Milner Guiland, 1994; Heimer *et al*, 1984; Jorgensen *et al*. 1993; Singer and Nichols, 1992; Bauer, 1989; Bauer & Pflieger, 1989) if they lead to serious changes in population structure. There are also important issues in the global trophy hunting industry, which at times, in the search for prized trophies, willingly and unwillingly violates national and international wildlife legislation (Pacelle, 1999). In Nepal this slow shift in attitudes is demonstrated in relation to wild sheep (see Case Study 12).

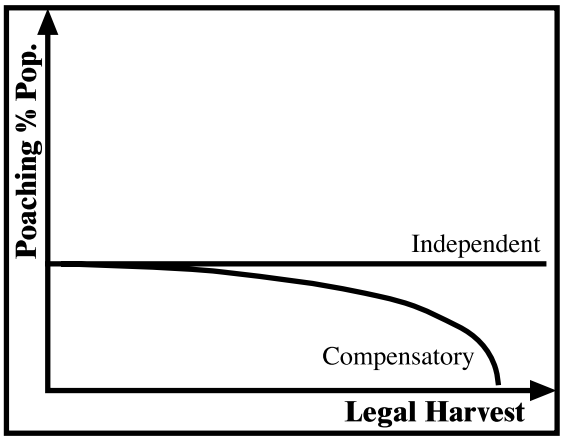
The contributions of hunters to the protection of waterfowl habitat and therefore, of waterfowl populations are unquestionable. It was waterfowl hunting which prevented agriculture from draining the Camargue wetlands, one of the world's most significant waterbird habitats in southern France, for rice paddies and corn fields (Kalchreuter, 1989). Hunters have made an invaluable contribution to waterfowl and wetland research (Kalchreuter, 1990). Ducks Unlimited, an American hunter organisation established in the 1970's after an alarming decline of migratory waterfowl (from approximately

220 million to 60-70 million birds), has become one of the most important wetland/waterfowl research organisations, commanding a research budget of 260 million US dollars in the late eighties (Kalchreuter, 1990). One of the contentious issues in waterfowl hunting is, however, the harvest of non-target species, which might be rare or endangered.

Poaching remains as one of the major conservation problems in many areas in the developing world. In Africa and South America there is a growing market in bush meat, in particular monkeys, while in China the rapidly increasing economy and standard of living drives a more and more demanding market for wildlife food and medicinal animal parts and plants. Relatively good roads and incentives have reduced the impact of poaching in the lowlands of Nepal (Maskey, 1999) however in the inaccessible mountains similar incentives are too expensive and too difficult to implement.

Speculation may be made as to how poaching would be affected through wildlife harvesting schemes (Figure 17). Experience in many parts of the world suggests that with an increase in legal harvest quota poaching declines and eventually disappears. We are, however, not aware of any studies which investigated this potential link.

Figure 17: Likely relationship between legal harvest and poaching



7.4.2 Conflicts with conservation

Hunters and conservationists in the 1970's and 1980's have generally been in opposition. More recently hunters have been able to demonstrate their contribution to conservation. However, contentious issues remain. International trophy hunting is such an issue. Our analysis of Trophy hunting advertisements may demonstrate this conflict.

Caprinae hunting and conservation ethics
Germany has one of the strictest and most successful hunting codes in the world: hunters have to undergo intensive training and 'conservation awareness'. Despite this conscientious effort, 16 (almost one quarter) of the advertisements found in the recent hunting journals sighted and analysed for this report were of species either classified as vulnerable either due to low population numbers or lack of knowledge on their status. One of these advertisements portrays a species as identified in the Caprinae Action Plan by IUCN as endangered (Shackleton, 1997).

This example shows that trophy hunting, while having potential for significant income for local communities, has to be internationally regulated in close cooperation with IUCN, CITES, national authorities and global communities. Effective regulation and close cooperation have, to date, rarely been achieved (Bauer, 1997; Lewis and Alpert, 1997).

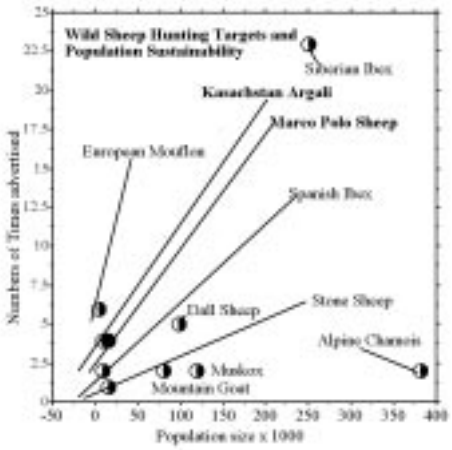
Alpine chamois are a prime example of the potential of a sustainable harvest industry for wild sheep. With almost 400,000 animals it remains by far the most abundant and secure of the Caprinae species, while at the same time being the most intensively hunted with 25-40,000 animals being taken annually in Europe.

It is remarkable to think that this species, which has successfully colonised New Zealand (with annual harvests of up to 20,000 animals in the mid 1980's) (Bauer 1982, 1985; Bauer and Gossow, 1989) has a market value of several million dollars annually in countries that are renowned for their high population density, industrial development and widespread conservation problems.

Caprinae trophy market and population size

For ten Caprinae (sub) species for which relatively reliable population estimates by the IUCN Caprinae Specialist group exist (Shackleton, 1997), a relationship between the size of the population and the trophy market is demonstrated in Figure 18. With the exception of both Argali species (Marco Polo and Kasachstan Argali) all populations occur in countries with relatively strict game legislation, a good understanding of their biology and status and efficient field infrastructure. For both Argali species the situation is less clear. Although both populations are relatively large (>8,000 and < 15,000 animals) poaching and livestock competition along with insufficient legislation and lack of population surveys have been deemed sufficient by the group of Caprinae specialists to consider both species as vulnerable. Despite this status each species has been advertised four times in the 'Die Pirsch' trophy hunting market in 1999. For a hunting community which is bound by both an internal and an external conservation code, this calls for better control, and also for dialogue between CSG of IUCN and Hunting organisations such as CIC and SCI. While the large population size would suggest that both species can sustain responsible trophy hunting, the onus to justify hunting by research on status and threats clearly lies with the hunters. At present this global responsibility is not being enforced by anybody.

Figure 18: Caprinae hunt advertisements and population size of hunted Caprinae species (popn size after Shackleton, 1997)



Case Study 12:
Wild Sheep Trophy Hunting and Wild Sheep Conservation in Nepal

Wild sheep are the world's most sought after trophy animals, for which trophy hunters are prepared to pay more than 30 000 US dollars for one single animal. It is a group that is also singularly threatened. The Caprinae action plan of IUCN Species Survival Commission recently documents that fully 71% of all sheep taxa (about 100) are threatened with extinction. Nevertheless, The World Conservation Union now has endorsed hunting and trophy hunting programs as potentially important tools in preserving wild species of sheep (Shackleton, 1997; Wegge, 1997).

Sustainable subsistence and trophy hunting of Caprinae have been recommended for Nepal's Himalayan protected areas by IUCN as one means to enhance their conservation. A typical example of the status of many wild populations in the world is given by Shackleton (1997) who presents research on the Thar, a primitive species of wild sheep restricted in its natural distribution to the southern flank of the Himalayas).

'Himalayan Thar is problematic. Known to be increasingly threatened by competition with livestock, loss of habitat and hunting, there are only limited solid population data. With conservative quota's and annual monitoring, there is probably a potential for limited subsistence hunting and also for some trophy hunting in appropriate populations'.

Shackleton (1997) 'Wild Sheep, Goats and their Relatives – Status Survey and Conservation Action Plan
IUCN-Caprinae Specialist Group/SSC

It is notable that Shackleton proposes that all three Caprinae species are relevant for Nepal's sustainable hunting programs as a means to aid in their conservation. This has also been suggested as early as 1976, (Wegge, 1976) and later by Bauer (1989, 1990a,b) and Jackson *et al.* (1990).

It is remarkable that in Nepal's protected Himalayan areas, only one area can cover more than 5% of their operational costs through park revenues (BPP, 1995). In Dhorpatan Hunting reserve foreign trophy hunters have shot trophy animals under a controlled harvesting scheme for more than 25 years (Wegge, 1976, 1997). During the 1988/1989 hunting season 25 licences for Bharal, 13 for Thar, five serau and seven goral licences were issued, which provided a total fee for the government (excluding charges to outfitters) of approximately 400 000 NR or 16 000 US dollars. In 1992 only 14 licences for Bharal and thirteen for Thar were issued (Goral and Serau being protected across the country) which however brought US$24,000 in government revenues.

8. HUNTING IN AUSTRALIA

8.1 Introduction

The move to diversify the game with animals familiar to individuals and those traditionally accepted as game by Englishmen had begun. This nostalgic process seems to have persisted and the concept of a traditional game animal is strong in the public mind. Perhaps it is one facet of a tendency to admire foreign products but to decry the local ones. It seems that if an animal is a traditional 'game animal' then it is considered legitimate for it to be hunted; if it is not such an animal, then the hunter attracts little sympathy. Thus a quail is a traditional game bird, so can be hunted; the numerous species of pigeon are not traditional. Deer are traditional, but Wallabies are not.

The English traditional concept of a game animal has little relevance for Australian conditions and is somewhat unfortunate for Australia, as it might promote further acclimatisation.

(Frith, 'Wildlife Conservation' 1977)

8.2 Indigenous Hunting In Australia

Australia remains the only continental mass where indigenous human culture is based on hunting and fishing without any domesticated species or other forms of agriculture. Why wouldn't one of the world's oldest and most continuous cultures develop agriculture within a time span of more than 100,000 years? Diamond (1998) attributes this to a lack of species that could be domesticated, but climatic factors as well as low human carrying capacity of the environment were also contributing factors.

Aboriginal patterns of land use were changed dramatically when Eurasian grains and herbivores started to replace native habitats and species. For the Aboriginal hunter the loss of native species was partly offset by the introduction of new ones, with feral pig now a highly valued game species for many northern aboriginal communities. European dominance over Aboriginal society and the displacement of native people from their land during colonisation has also manifested

itself in hunting legislation. In this legislation hunting was either restricted or made illegal for native people although it continued to be the basis of their cultural identity and survival. This legislation, as a review by Collins, *et al*. (1997) demonstrates, continues to superimpose values of urban western society and increasingly modern conservation on Aboriginal communities.

This recent review on the recognition of native hunting rights in Australia, has pointed out a number of deficiencies which need to be addressed. Differences in the degree of recognition given to indigenous hunting, fishing and gathering by each State and Territory in Australia persist, despite the recommendations of the Australian Law Reform Commission and the Resource Assessment Commission. Australia is not fulfilling its international obligations to protect the rights of indigenous people (Collins *et al*., 1997). These rights exist as common law and are recognised by many international conventions and countries with indigenous populations. The Australian legislative framework for protection of the resource rights of indigenous people, leaves much to be desired. This is particularly so in respect of those indigenous people who cannot demonstrate their native title rights as they may receive little recognition of their right to practice their contemporary traditional culture.

A workshop on the use of wildlife by indigenous people (Turner & Nugent, 1995) recommended guiding principles that warrant recognition of Aboriginal and Torres Strait Islander hunting and gathering rights.

8.3 Hunting By European Settlers

> *Coursing the Kangaroo and Emu forms the principal amusement of the sporting of the colonists...it was found on various occasions that the kangaroo was capable of affording an excellent day's sport. The native dog also, which is a species of the wolf was proved to be fully equal in this respect to the fox.*
>
> **(Wentworth, 1820)**

The early European settlers of Australia, and particularly those of the more privileged classes, were generally dissatisfied with the rewards of hunting native species. With the exception of crocodiles, which

were remote from early settlements, and waterfowl that were commonly taken in vast quantities for sale and table consumption, the trophy and food values of native species and the challenges of taking these species were not highly regarded. Mass killing of macropods and even koalas, probably associated with population eruptions made possible by habitat modification (clearing, increase in availability of edible grasses and reduction in predator numbers) became a common rural pursuit which persisted into the 1960's, at least in New South Wales.

The perceived poor quality of the native mammals as game led to the early introduction of rabbits, hares and foxes and the establishment of 'Acclimatisation Societies' which arranged for the introduction of six species of cervids (Red, Fallow, Rusa, Sambar, Chital and Hog deer) and Indian Blackbuck. All but Blackbuck survive in substantial, if sometimes parochial, populations to the present time. Deer hunting commenced and remains as a sport.

8.4 Hunting In Contemporary Australian Society

Hunting in contemporary society in Australia continues to be an important form of recreation with an estimated 900 000 hunters or 5% of the Australian populace engaging in it in some form or another. In northern parts of Australia, hunting continues to be a major form of sustenance and recreation for Aboriginal communities, while in southern and south eastern regions most Aboriginal communities have, by choice, legislation and lack of suitable land, given up their traditional use of land.

Recently, triggered by changes in major global conservation organisations towards the utilisation of wildlife, (e.g. IUCN 'Caring for the Earth'), Australia has somewhat relaxed it's position to and is starting to explore ways of sustainable utilisation of native wildlife. This is illustrated by the establishment of a Senate Inquiry on the 'Commercial Utilisation of Australian Native Wildlife'. The report of this Inquiry was released in June 1998 and revealed a 'high degree of disagreement' about the ethical desirability of the commercial utilisation of wildlife. After extensive hearings and the analysis of 341 submissions the Committee further concluded that 'there is in all likelihood a large majority of people who hold the view that there

could be some sustainable use of wildlife, with differing views on which species can be used and under what circumstances'. The Committee further concluded 'the future of biodiversity conservation in Australia now depends very much on finding mechanisms, and particular financial incentives, for natural habitat to be restored and conserved on private lands'. The Committee further concluded that if appropriately managed, commercial utilisation of wildlife is such a mechanism.

With this recent move, Australia has finally, after many years of debate, signalled its intention to follow many other countries and major conservation agencies, including the World Conservation Union (IUCN), which have endorsed the sustainable use of wildlife as an important tool to conserve biodiversity and to support indigenous people.

In order to do so various issues in legislation, access to land and organisations need to be resolved.

8.5 The Recreational Hunting Industry In Australia

> *In many parts of Australia there are few places where a sportsman can hunt unless he knows personally a landowner with like interests. Many private lands are now closed to hunters because of irresponsible acts by people not trained in the use of firearms or even, sometimes in common courtesy. There are few hunting reserves in the country. Public lands usually have a regulation or two that forbids hunting.*
>
> **(Frith 'Wildlife Conservation' 1977)**

Hunting in Australia can be carried out on private land, on Crown land or in State Forests, subject to permission by landowners. It is generally not permitted in national parks and protected areas (with some exceptions, for example, in Victoria), even for the purpose of controlling feral exotic pests. The wildlife protection laws are commonly disregarded and many protected animals are hunted quite heavily with no official supervision. Each State continues to have some legal game, including waterfowl (except New South Wales, where waterfowl hunting has been outlawed except for rice crop protection), one or two species of quail and a snipe in some States. In

some States no native mammals are legal game, but in Tasmania and South Australia, hunting kangaroos and wallabies is legal under permit.

A number of domesticated species, including pigs, goats, Asian buffalo, banteng cattle, camels, donkeys, horses and sheep, established large and widely spread feral populations. All of these species, and particularly the first four, plus waterfowl, quail, snipe, foxes, rabbits and hares, have become the stock in trade of the recreational hunter over most of Australia. 'Pest control' has been the catch cry of many hunters of these species and selectivity of the target has generally been a secondary objective to quantity of animals taken. A good deal of this type of hunting is nocturnal and is aided by powerful spotlights.

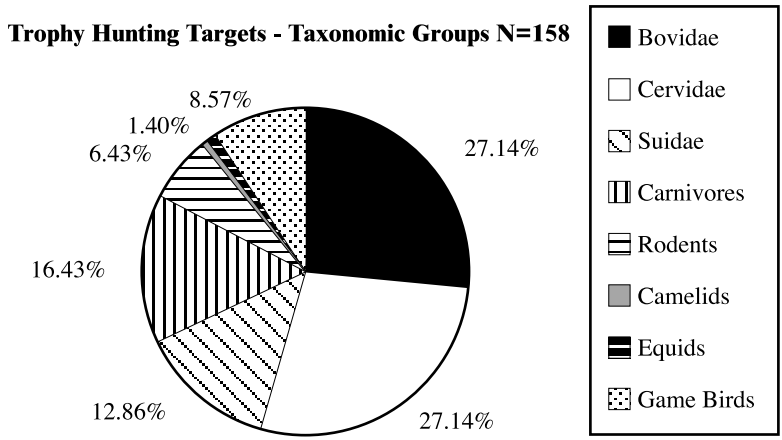
Specialist hunting has developed, again often involving 'pest' species and specific techniques. Known in the field as 'vermin' hunting, the pursuit of dingoes, foxes, cervids, rabbits and raptors, for example, with small calibre, heavy barrelled rifles at long ranges, is seen in the fraternity as an elite and often expensive, selective sport.

Apart from studies relating to waterfowl and quail, recreational hunting has been the subject of few scientific studies in Australia. Because of the existence of trade based upon their products, the commercial kangaroo and previously, crocodile hunting, industries have been rather better studied, generally from the position of regulation by statutory wildlife conservation agencies and for the development of formal management programs.

8.6 Australia As An International Hunting Tourist Destination

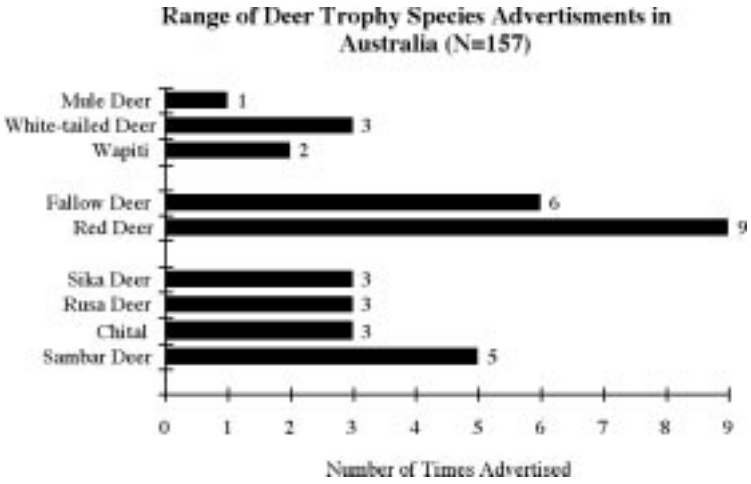
The analysis of international Trophy hunting destinations and species suggests that Australia is currently only a marginal destination point for international outbound hunters, with water buffalo and banteng in the Northern Territory being the only species advertised (Figure 19). This poor representation is not related to the range of hunting experiences Australia offers.

Figure 19: Range of hunting target species in Australia as advertised in hunting journals (N=158)



Australia and New Zealand have become notable destinations for deer hunters as there are eight species of deer that can be hunted (Figure 20). In addition to deer, waterfowl, quail and snipe, some of the introduced free-living mammals, including pigs, Asiatic water buffalo, banteng, goats, camels, rabbits, hares, cats and foxes, are potentially attractive target species to international hunters.

Figure 20: Range of deer species advertised in hunting advertisements in Australian Hunting journals in 1999



These species are responsible for varying amounts of ecological damage, and while recreational hunting of them is still subject to criticism on ethical and animal welfare grounds, their hunting poses no species conservation problems.

The relatively undeveloped formal infrastructure for hunting and an embryonic hunter service industry in most of the country compared to North America and Europe are important factors limiting the attractiveness of Australia as an international hunting destination.

Guided hunting, on public or private lands, is still a very small industry in Australia but is growing in size, with European, American and Japanese tourist hunters as the prime market. In the absence of much public land dedicated or available under licence to hunters, access to land on which to hunt has for long been a major issue among hunters and one often leading to a good deal of effort, competition and secrecy. This has probably been exacerbated by recently tightened controls on gun ownership and use. The highly urbanised nature of the Australian population, particularly in New South Wales and Victoria also means that the majority of hunting is in relatively remote

locations on privately owned or leased property. This is where continued and privileged access is heavily contingent upon maintaining good relations with the land owner/lessee/manager.

Commercialised recreational hunting has been increasing in Australia over the past two decades. In New South Wales there are thousands of private rural properties providing paid, unguided hunter access. A much smaller number provide guiding services for deer and other feral species. Access and service costs range from $50/day for duck hunts and up to $500/day for pheasant and partridge hunts. Buffalo and Banteng hunts range up to $10,000 per trip in the Northern Territory and far north Queensland (Draft National Hunting Policy). Commercial hunting, particularly with trained guides, is viewed by the authors as very much underdeveloped and under marketed, both within Australia and overseas.

8.7 Economics Of Hunting In Australia

'The hunter is part of the countries social and economic framework. The sport provides his recreation. His activities create demands for industry to produce his equipment and to provide his transport and accommodation in the field. Hunting is a legitimate occupation provided the animal population are properly managed to ensure that they are not depleted, that the sportsmen follows the strict ethics that the sport demands and that he helps pay for his privilege. Most hunters are prepared to meet these requirements'.

(Frith, 'Wildlife Conservation' 1977)

8.7.1 Australian hunting expenditure

Many Australians go hunting. Brown (1996) estimates the total number to be around 900 000 people or about 5% of the Australian population. The 1997 Draft National Policy for Recreational Hunting, prepared by the National Hunting Policy Working Group, comprised of members from the major national hunting organisations states that, in 1997, recreational hunting or cultural hunting was practiced by over a million Australians. This may have declined somewhat in subsequent years, but there are presently 1.2 million licensed shooters in Australia, plus a growing number of bow hunters. In comparison,

there were, in 1997, 4.5 million recreational fishermen and 700,000 golfers.

The Draft National Policy also states that in simple economic terms, recreational hunters generate in excess of $1 billion dollars annually, through the purchase of vehicles and equipment, hunting access fees and licences and downstream related employment activity. An estimated $325 million of this flows to regional communities.

8.7.2 Deer hunting In Australia

At least 17,500 people take deer hunting in Australia very seriously. The survey reported by Cause (1995) indicated that these deer hunters spend a total of more than A$100 million for hunting (Figure 21).

Figure 21: Australian deer hunter expenditure

COST ITEM	A$ (MILLION)
Trip Costs and Consumer Supplies	36.05
Overseas Trip Costs	8.41
Equipment Expenditure	58.44
TOTAL	**102.90**

Figure 22: Brian Boyle with his sambar stag in Victoria

By far the most important hunting resource in Australia is sambar deer (Figure 22) with an estimated present population in Victoria alone around 20-25,000 animals (McClure, 1996). This population supports an annual harvest of more than 8,000 animals which annually generates a recreation value of A$19.73 million for trip costs and consumer supplies (Cause, 1995).

8.7.3 Overseas hunting by Australians

Cause's (1995) survey also showed that 8.9 percent of the questionnaire respondents went on overseas hunting trips on which they spent approximately AUS$5,480 or a total of AUS$630,189. If this figure is taken as representative and extrapolated to the 17,500 'serious deer hunters' Cause estimated for Australia a total number of 1,557 hunters who go on overseas hunting trips, spending approximately A$8.41 million. More than one third of this money is spent in neighbouring New Zealand. Figure 23 shows that adventurers either go to New Zealand or North America.

Figure 23: Overseas hunting destinations and trip costs for Australian hunters

COUNTRY	NUMBER OF RESPONDENTS	MEAN TRIP COSTS A$
New Zealand	79	3,215
North America	19	10,453
Europe	11	5,445
Africa	6	19,617

8.8 Hunting Culture And Conservation

During the past 20 years Australia has developed its own models of sustainable hunting. Duck hunting in South Australia, Quality Deer Management in Tasmania and Victoria are examples of this. A National Hunting Policy that identifies hunting as an important land use and a potentially powerful conservation tool in with a multicultural society (Aslin & Norton, 1995) will need to be developed. Indigenous societies will need their requirements placed in this policy.

8.8.1 Hunting and the control of feral animals

Australia's position towards exotic species is ambivalent (Bomford & O'Brien, 1995). Rabbits, viewed by many conservationists and farmers alike as the major ecological threat in Australia, are the basis of an important and at least recently viable industry for many people. Similarly, feral goats, feral pigs and water buffalo which are perceived by conservationists, national park managers or ecologists as major environmental threats, have become a resource for farmers, Aboriginal people and hunters. The greatest ambivalence towards any exotic species in Australia is shown towards deer. Six species (from 20 species introduced between 1850 and 1950 (Ramsey and English, 1992) have become a major resource in the recreation of 17,500 deer hunters, who spend A$50-60 million annually on their hobby (Cause, 1995) and harvest approximately 15,000-20,000 deer in Australian forests. At the same time their impacts on native ecosystems remains for the most part unknown.

The decline of pastoral industries during the past ten years has been accompanied by a resurgence of interest in more diverse new products and markets. Cotton, at least where irrigation water is available, has replaced grazing, often creating more severe environmental impacts.

Amidst this diversification of an agricultural production base, indigenous products and feral exotic species are in danger of being ignored. Yet questions are being increasingly asked by conservationists, ecologists and policy makers as to why the utilisation of native and introduced wildlife is not being promoted more

rigorously (Grigg, 1995; Webb, 1996), a question dealt with in the 1997 Senate Inquiry. Questions of utilisation were asked about unlikely candidates such as the koala (Martin, 1996; St. John, 1996; Tabart, 1996) or Palm Cockatoo (Vardon *et al*. 1996). More likely candidates for commercial utilisation such as large macropods, in particular red kangaroo, western grey kangaroo and wallaroo/euro, are, on the other hand, targets for a rather large (approx A$280 million) meat industry. Although this industry is controversial, (Alexander, 1996; Freudenberger, 1995; Grigg, 1995,1996; McAllum, 1995; Switala, 1995) it harvests close to 2 million kangaroos annually.

Similarly, policy makers and the industry are highly uncertain as to what to make of feral exotic species. Here uncompromising (and mostly entirely unfeasible) extermination policies have given way yet again to more cautious approaches based on cost-benefit ratios (Bomford and O'Brien, 1995) and the likely benefits of control utilising these species for conservation (Choquenot *et al*, 1995; Grigg and Lunney, 1995; O'Brien and Bomford, 1995). At the same time deer and all potential exotic pests are more or less openly promoted by hunters and the Australian Deer Association.

8.8.2 Current legislative framework

The control of wildlife use, both commercially and non-commercially is regulated through both State and Federal legislation. Most legislation concerning the commercial utilisation of wildlife lies within State government control, although export from Australia is subject to Federal control. There are considerable differences between States with most liberal hunting legislation in South Australia and the Northern Territory, more restrictive ones in Victoria and New South Wales. Tasmania has recently introduced a Game Management Unit into its National Park and Wildlife Service thus signalling the willingness to acknowledge hunting as an option within its policy framework.

9. CONCLUSIONS AND RECOMMENDATIONS

9.1 Key Issues In Global Hunting For Australia

'The hope is sometimes expressed that all these instincts (Leopold refers to hunting) will be outgrown. This attitude seems to overlook the fact that the resulting vacuum will fill up with something, and not necessarily with something better. It somehow overlooks the biological basis of human nature – the difference between historical and evolutionary time-scales. We can refine our manner in exercising the hunting instinct, but we shall do well to persist as a species to the end of the time it would take to outgrow it'.

(Leopold, 'Game Management' 1933)

What are the global challenges for hunting? They are not as ambitious as fighting the greenhouse effect or saving the tropical rainforests, at least at a first glance. The first challenge for hunting is simply to survive in a modern society. However, considering the importance of hunting for 250 million indigenous people and the importance of hunting to cultural diversity or to rural industries or traditions, this challenge becomes bigger.

Conservation, during the 1970's and 1980's had no tolerance at all for recreational sport hunting, and little tolerance for hunting by indigenous people. The latter have often, through the establishment of protected areas, lost their entire production landscapes and have become marginalised. They were forced to change their traditional land use patterns which were deeply entrenched in customs and social systems, often with disastrous consequences, as the study on the Eek Mountain people in Sudan portrays (Turnbull, 1964).

In the 1990's there was a remarkable relaxation in the attitude of major conservation agencies such as IUCN and WWF towards indigenous hunting and even to recreational hunting. This occurred simply because by this time it had become obvious how important the former was and how potentially valuable the latter might become as a generator of revenue for conservation. We have identified what we believe to be key issues for hunting in Australia:

More involvement of hunting organisations with international conservation projects.

There are very few international projects where hunters are successfully cooperating with conservation agencies. The lack of joint projects is due to unwillingness on both sides to cooperate, mostly because of ideological reasons. However, during the past 5-10 years there has been an increased willingness on both sides to cooperate. Now it is time to explore avenues of cooperation in more detail. There are successful cases of cooperation, in particular in waterfowl hunting and wetland conservation between FACE/CIC and the International Waterfowl and Wetland Research Bureau.

Greater involvement in ideological disputes.

Hunters have become extremely defensive. They need to develop an internal system whereby they exchange thoughts and ideas, along with a willingness to openly discuss these with outsiders.

Better international liaison and cooperation.

CIC and Safari Club International have emerged as the two main hunting organisations with international agendas. Both organisations remain rather elitist and have often failed to include local communities. Australia's active chapter of SCI needs to become more involved in above issues and seek cooperation with overseas agencies such as CIC.

Development of acceptable hunting models for protected areas.

Hunting in protected areas has become a big issue. In Swiss and German national parks hunters have always demanded the right to be able to regulate ungulate numbers (which at times reach pest proportions) In many Third World countries some hunting models do reduce imbalances, reduce over populations and satisfy community demands. Only South Africa and Zimbabwe have made any headway on this.

Development of efficient self regulation in international trophy hunting.
Despite the efforts of both SCI and CIC to introduce more efficient control into hunting activities in third world countries, very little has been achieved. This is at least partly due to the fact that hunters spend a lot of money on their latest firearms, while failing to contribute a substantial percentage to conservation and the security of their game resource.

Involvement of Indigenous people in the development of national conservation and hunting legislation.
There are an increasing number of examples, in particular in Canada, where indigenous communities have successfully started to develop hunting plans and regulate their own hunting affairs. This local and indigenous involvement could serve as an example to many developing nations and to Australia.

Developing projects to establish and implement national hunting policies in developing countries.
Hunting policies are lacking in many countries including Australia (which is currently formulating one). The development of such parties will be integral to future hunting. In many countries legislation implemented with the aid of international organisations has not been able to catch up with latest ideological changes in the conservation front.

Green globe and green bullet.
There are an increasing number of environmental auditing and accreditation systems under development or already established particularly in Germany and USA. A most recent move by Green Globe Asia Pacific has been established in Australia as a subsidiary of the Cooperative Research Centre for Sustainable Tourism (CRC). Head Quarters of Green Globe 21 remains in London, UK. Most of these systems are voluntary and work through peer and consumer pressure. Green Globe aims to use these pressures to gradually develop a more sustainable tourism industry based on independent auditing of a number of benchmarks (biodiversity impacts, community benefits, energy management, waste management and water management).

For Trophy hunting in Africa, Lewis *et al*. (1997) has suggested a 'Green Bullet' accreditation system. A Trophy Hunting Voluntary Accreditation system could easily be made part of the Green Globe Accreditation system.

Better training and accreditation.
Hunters need to demonstrate to society that they are fit to handle firearms safely. They also have to demonstrate that they can identify their prey and kill it as humanely as possible. Present education and training networks cannot meet that challenge in many countries. The development of accredited courses in game management could partly address this need.

9.2 Present And Future Key Issues Of Hunting In Australia

'In Australia the legitimate hunter has few opportunities to practice his sport and these are decreasing. The number of people who seek this type of recreation increases, but social attitudes towards the principle of hunting, increasing legislation that reflects these social attitudes, and a decreasing availability of places in which to hunt, as well as declining populations of some game animals, all operate against the hunter. In a new country with a novel fauna, even when it had been populated by people from Europe, with their own traditions, one might expect that a native tradition in game and hunting would develop to use fully the products of the new land. In the very early days this did happen and a great number of native animals were hunted, though the populations of some could not stand it. But even then there was a move to bring in deer and other familiar animals'.

(Frith 'Wildlife Conservation' 1977)

9.2.1 What kind of hunting?

As in North America, Europeans in Australia and New Zealand hunted during the early phases of settlement with little or no regard to the conservation of species or of the needs of indigenous people. As in North America the demise of a number of species and of many indigenous tribes has been at least partly due to indiscriminate hunting. Unlike in North America however there has been a notable absence of large 'exciting' native species or trophy species. This has

shaped to some large extent the attitude of society, hunters and conservationists to game species.

The introduction of game species has had many consequences - not only ecological ones. It was the ungulates, in particular deer, feral pigs, goats and water buffalo which have been favoured not only as game species, but which have also done exceptionally well in the new environment. There is a great ambivalence towards deer species in Australian society, particularly among hunters and conservation agencies. What is the real status of deer in Australia? Are they exotic pests which are slowly but surely invading many parts of the Australian environment and affecting/replacing native species? Are they prized game species with significant recreation potential for hunters? Are they part of the national colonial heritage such as rusa deer in Royal National Park? Are they an alternative to the sheep and cattle industry, which, after all, are the major culprits in the degradation of the Australian environment? In our eyes deer are all of these at once and there is no simple policy position or management solution. Deer species differ. What applies for hog deer is different for red deer and chital and sambar and while one species might be of potential legitimate use or even benefit in a specific environment, another might pose a threat. Deer species in the Australian environment require highly differentiated management regimes.

There is however one fact which stands out about deer in Australia but not New Zealand. We know very little about the ecology, population dynamics and ecological impacts of deer in Australia. Conservationists and ecologists have done little research on their dispersal, ecology and effects on the Australian environment and hunters themselves have attempted little so far to come to terms with their game potential, and the hunters' role in their management. After all the annual harvest of this species is now close to 10,000 animals, constituting a A$50 million industry. During the past 10 years, several examples have evolved in Australia to develop a sustainable deer hunting industry. These examples also strongly suggest that deer hunting can be an important contribution to rural economies struggling for survival.

9.2.2 Opportunities for the development of hunting

Australia has a range of game species, many of them feral which require control, which gives hunters the opportunity for hunting experience as well as for contribution to conservation. Large private farms such as in South Africa and Namibia can be used for responsible hunting and farm income. The Fallow Deer Quality model of Tasmania demonstrates such an opportunity.

Case Study 13:
Management of Wild Fallow Deer in Tasmania: a sustainable approach

Fallow deer (Dama dama) are the only deer species established in Tasmania and the current population estimates range from 15,000-18,000. Approximately 3,500 hunters harvest about 1,500 animals annually during the legal hunting seasons, with additional females harvested under crop protection permits. Previous deer management strategies in Tasmania have failed to find sustainable solutions to many issues such as habitat loss, crop damage, competition with livestock, and declining deer herd quality. In 1993, the Tasmanian Deer Advisory Committee Inc. (TDAC) initiated a project to develop long-term strategies to address these issues. Their approach had been to initiate Property-Based Game Management Plans (PBGMPs). PBGMPs are property-specific written agreements between landowners and hunters that provide strategies for managing deer and other wildlife at acceptable levels while achieving a broad range of conservation objectives such as habitat retention and/or improvement. The initial results of these plans are encouraging and demonstrate that, when properly managed, wild deer can provide benefits to government agencies, landowners, hunters, the community, and even native wildlife. The project is the first of its type in Australia and, if successful, may serve as a model for other State wildlife agencies to follow regarding the management of wild deer.

Murphy B.P. (1995) Management of wild fallow deer in Tasmania: a sustainable approach. In Grigg, G., Hale, P. and Lunney, D. (1995) Conservation through Sustainable use of wildlife. Centre of Conservation, University of Queensland, Australia

9.2.3 Constraints for the development of hunting

'HUNT 2000', a contribution from T. Gray representing Safari Club International, addresses the promotion of hunting. He concentrates on

the survival of hunting and sees the major issue for hunters to become pro-active and not just react to the negative images of hunting that are common in the public domain. His main strategies are image building by clever advertising. While we do not dispute this claim we would like to have it examined more closely for Australian conditions. In America it may be easy to find many positive examples of hunters and easy to exploit these in image building. In Australia many of these images have yet to be developed. However, there are now models available, such as the Property-Based Game Management scheme in Tasmania which might well serve as an Australian model and which needs to be explored in other areas and under different circumstances. From a Natural Resource Management point of view it might even become a model which can play a role in recreational and commercial fishing.

9.2.4 The hunter's image

Hunters in Australia have a rather negative image in the public's mind. This negative image is not just amongst people from urban areas and our professional colleagues. In our eyes, this image is the biggest obstacle hunting faces in order to survive and become acceptable in the public arena, amongst conservation groups and/or professionals.

This image can be modified. In our view it is not a matter of making big multi-media campaigns, although these may be important. There is simply much work to be done. Making contact with conservation agencies and NGOs and other non-hunters. Developing projects can be shown with pride. Not just projects connected with hunting or trophies, but significant conservation projects. Hunters could develop their own population and habitat monitoring systems. They could get involved in setting up conservation projects for Mallee fowl or Australian Bustard - once magnificent game species not necessarily to be included again on the hunting list, but simply to be conserved and re-established in the wild. Why shouldn't hunters do these things? These are some important issues we think hunters should think about:

1. What role can and should hunters play in research?

2. Cooperation with other agencies.

3. Development of contacts and joint programs with Aboriginal groups.

4. Development of contacts between international hunting / conservation agencies.

5. Development of more interest in the conservation of native species.

6. Promotion of recreational meat hunting (grey/red kangaroos / emus).

7. Development of an Australian hunting organisation.

8. Development of a core image group.

Case Study 14:
Hunters working with Indigenous People: Lessons from the Yukon

In the Yukon region in Canada far-reaching compensatory treaties are currently negotiated with indigenous people. In its evolution towards a province the Yukon Territory will give not only 80 % of the territory back to its indigenous Indian tribes but give them a major say in game harvest including the harvest of fur bearing animals. Hoef (1999) describes the process to achieve this and predicts that outfitters who have developed good relationships with the indigenous people of their territory will find it easier to operate in future. While other people who do not, in particular those with concessions around population centres will have to struggle or have to cease their operations altogether. Lisa Palmer in her review on indigenous people of the Northern Territory emphasises the lack of involvement of Aboriginal people and disregard shown toward them by outfitters. As landowners Aboriginal communities will have a number of opportunities to realise returns from wildlife:

1. Develop own operations for hunting.

2. Give concessions to hunting operators who are well regulated.

3. Enter into partnerships with operators.

4. Develop strategies for their land that minimises benefits for Aboriginal subsistence hunting while combining it with the potential for trophy hunting.

9.2.5 Some important directions to go

Education and research
Hunters in Australia have developed few training and examination programs with some exceptions, such as in duck hunting. There has also been very little participation in research. In order to develop a better image, the establishment of a hunting research centre to promote research on the sustainable use of wildlife would seem an essential step, in particular as few results from the northern hemisphere are transferable.

1. Development of a national training centre for hunting.

2. Exploring the recreational aspects of hunting.

3. Development of training programs for hunters in ecology, wildlife management and conservation (e.g. at universities, colleges).

4. Development of a research program with other land agencies.

5. Develop contacts with tertiary institutions to promote research, training and image.

6. Development of best practice game management areas.

7. Development of research and management strategies.

8. Development of research institutions.

9. Development of participatory research program.

Self regulation and self control
We consider that this is one of the most crucial and sensitive issues hunters have to address if they are to be accepted by society. Serious thinking has to be done on the relationship between serious hunters and shooters, about the necessity of certain forms of high velocity ammunition or semi-automatic weapons. From our perspective the lack of formal training and examination in wildlife/hunting and conservation issues as is the case at present is neither acceptable nor prudent. It should also be known that the conservation role of the

hunter cannot be exhausted in culling exotic animals. Active participation in restoration programs for native species, not to restore them as potential quarry, but simply to safeguard their existence as practiced in the past, is one possible suggestion.

Tackle firearms issue (hunter versus shooters)
Australia has become very sensitive to private firearm ownership and use. It will be very much up to the hunters to demonstrate their need of particular firearms and their willingness to cooperate with legislation.

Address hunting in different land tenure systems
So far hunting in Australia is allowed on private property, on State Forests and on some Crown lands. All hunting is subject to permission by the landholder or land manager. Access to privately owned or managed lands could easily be improved if financial incentives were offered to landowners (see Murphy, 1995).

Trial some innovative new hunting systems (licence/lease)
During the past years some very innovative and beneficial systems have developed in Tasmania, Victoria and Queensland particularly in respect of deer hunting. There are also very successful examples of wetland management for waterfowl hunting by the hunters in South Australia. There needs to be more dialogue to develop more such models and to make them known to the public.

Development of a national hunting strategy
Recreational fishermen have developed their National Policy. Australian hunters are currently in a prolonged and difficult process of developing a National Hunting Strategy. So far unpublished, this document in its draft form testifies to the serious attempt by hunters to come to terms with image problems, lack of organisation and lack of promotion. One of the key issues will be a more open and healthy dialogue between hunters, conservationists and land managers.

Tackling difficult issues with native species
Crocodiles are Australia's most ferocious terrestrial predators and intensive hunting has been stopped after one species, the salt-water crocodile was almost driven to national extinction by uncontrollable hunting. The present recovery of crocodile numbers has been

accompanied by an increase in crocodile farming and tourists wishing to view crocodiles. In the vast hinterland of the Australian north crocodiles have once again become a threat to livestock and humans yet there is little intention to allow crocodile hunting.

Sustainable use, international treaties and Australian legislation
Australian policy makers have had difficulties in accepting and fully implementing international treaties. King (1995) has pointed to an interesting discrepancy between sustainable use and national obligations towards international treaties. Australia supported the adoption of sustainable use as a means for conservation at the IUCN meeting in Perth and at the CITES meeting in Kyoto in 1992. In a section of this treaty there was international agreement, to which Australia subscribed, that sub-Saharan populations of the African leopard would be subject to an annual export quota of several thousand animals. At the same time however the importation of endangered species into Australia is controlled by the Wildlife Protection (Regulation of Exports and Imports) Act of 1982. This act prevents any hunter who has legally shot a leopard in Africa to import his/her trophy to Australia, in this way preventing the implementation of a conservation strategy it has previously condoned.

Lessons from New Zealand

'Deer hunting is integral to the national psyche. If you doubt that take a brief look at New Zealand literature, poetry or art. Deer hunting is tied culturally to tramping and mountaineering, and the pattern of those three activities, in combination defines much of the difference between New Zealand and the rest of the world. The formative mythology of the New Zealanders is not easily dissected, and perhaps it should not be attempted because to dissect is to destroy. But some of its elements can be displayed without trauma: water on fern, breaking out of the forest onto snow grass, a fist in the scrum, the lobbed shot that comes off, the flooded river that must be crossed, the piton that gives just a little,' and the antlers in the hall, sings Harry'.

Graeme Caughley, 1983: The Deer Wars, the story of deer in New Zealand.Heinemann. Auckland, New Zealand

A brief look to New Zealand shows a hunting environment that could not be more different than in Australia. Bookshops in New Zealand show a formidable section full of hunting books, in particular deer hunting, testifying to the importance of hunting and the development of a 'rural deer culture'. NZ has done well in terms of hunting. Within less than 1000 years Maori's destroyed a large, diverse, unique fauna of large flightless birds (7 genera and 25 species). Within less than one hundred years NZ has become an island now considered as one of the world's safest and most rewarding destinations for hunting. The range of trophy species in NZ is exceptional (rusa deer, sambar deer, white-tailed deer, red deer, sika deer, fallow deer, Himalayan thar, alpine chamois, wapiti and moose). Although the environmental impacts of mammal species, including ungulates in New Zealand are many and undisputed (Bauer, 1982, 1984; Bauer and Gossow, 1990; Riney & Caughley, 1971). No matter what the opinion, most ungulates in New Zealand are there to stay. Fifty years of intensive and unsuccessful control efforts have demonstrated this (Bauer, 1982; Caughley, 1983; Challis, 1984). Even if new technology would provide the means, hunting and deer have become such an integral part of the national identity in New Zealand, that there would be no public willingness to do so. Introduced wild ungulates in New Zealand have become an agricultural and cultural resource such as farmed sheep, deer, cattle or Pinus radiata. It is unlikely they have caused as much damage.

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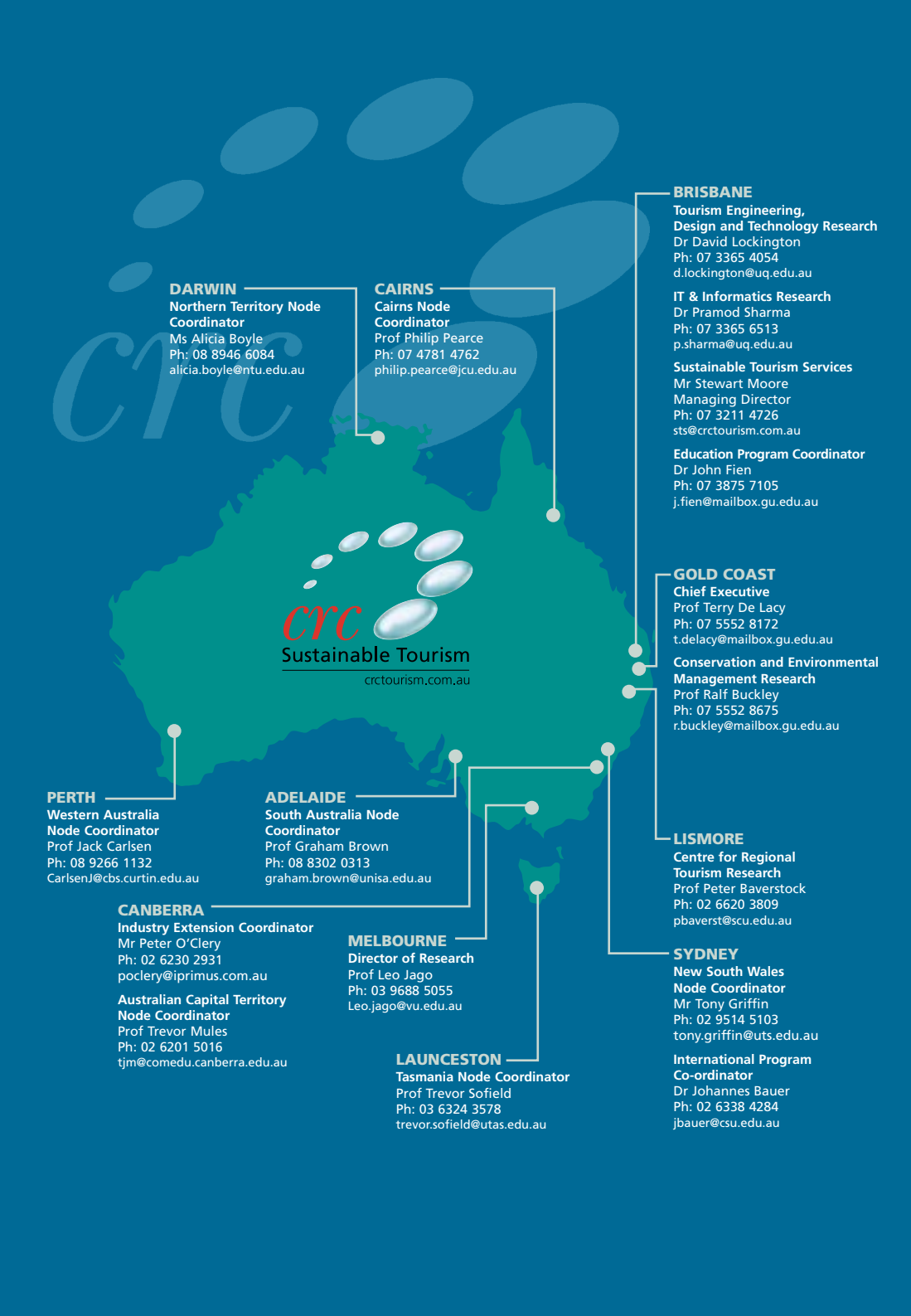

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