Workshop Stream V: Evaluating Management Effectiveness

Session 4 e and 5 e: Collapse From the Inside: Threats to biodiversity and ecological integrity of protected areas from unsustainable hunting for subsistence and trade

Introductory overview: review of the scale of the problem in protected areas throughout the humid tropics, and the implications for the ecological integrity and local people

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Introduction

People have been hunting wildlife in tropical forests for at least 10,000 years in Latin America, at least 40,000 years in Asia, and probably at least 100,000 years in Africa. This led to some species extinctions, such as giant lemurs in Madagascar and giant sloths across the Americas. In general, however, especially on large continental land masses, people and wildlife managed to co-exist, and for the vast diversity of large terrestrial vertebrates in tropical forests today, any past hunting must have been sustainable.

This is no longer true for many species in many tropical forests today – even in protected areas. Some protected areas are turning into classic "empty forests". They look wonderful on satellite images or aerial photos, but they might have lost their wildlife due to over-hunting.

This talk reviewed:

- reasons why hunting in tropical forests has increased in recent years;
- the scale of hunting in tropical forest protected areas today;
- the implications of this for: the ecological functioning of the forest and the well-being of local peoples.

The talk concluded with a brief summary of potential solutions.

What has changed?

In recent years, many changes have caused the rates of hunting to increase throughout the world's tropical forest protected areas:

- human populations have greatly increased;

- protected areas are increasingly becoming isolated islands or with logging or other roads coming up to their boundaries. This means that hunters and wildlife traders can easily enter the protected area and wildlife can easily be carried out;
- hunters now use modern weapons. Traditional hunting methods such as bows and arrows, blowpipes and traditional snares have largely been replaced by wire snares, shotguns and high powered weapons. All are more efficient and less discriminating, so they result in the hunting of more animals, of a wider range of species;
- hunting has now become commercialized, and in many cases is big business for meat, skins, trophies, furs, and parts for traditional medicines. Examples are: annual sales in one Malabo market include: 12,974 mammals, or 112 t of dressed meat; in May 2003, 4.5 t of pangolins were seized in Hanoi; in 2000, 20 t of turtles were exported from Sumatra every week; annual sales in one north Sulawesi market included 3850 wild pigs, 200 macaques, 75,000 rats & 15,000 bats. In South-east Asia at least, much of this is from protected areas;
- political instability and warfare also drive up hunting rates and make high-powered weapons more readily available.

The problem of hunting in tropical forests

The problem of over-hunting is especially acute in tropical forests and other habitats with very low productivity for terrestrial vertebrates. The wildlife which people eat from tropical forests mainly comprises primates, ungulates and sometimes rodents; primates especially have low reproductive rates.

A tropical forest sustainably produces about 150 kg/km^2 of vertebrate biomass per year, yet annual hunting rates in many tropical forest reserves are much higher than this. Examples of annual offtake rates are:

- Arabuko-Sokoke Reserve, Kenya: 349 kg/km^2;
- Manembonembo Wildlife Reserve, Sulawesi: 701 kg/km^2.

In addition, management capacity, whether by local communities, governments or others, is extremely limited in most protected areas across the tropical forest world. Thus, hunting pressure is often no different between inside and outside protected areas, resulting in wildlife disappearing across the landscape, irrespective of the protected status of the land.

The problem is especially acute in Asia where human population densities are extremely high so pressure on land is often acute, and where the demand for wildlife products for food, pets and traditional medicines is often high.

The result is that wildlife populations in many protected areas across the humid tropics are being reduced. For example, in Asia:

- hunting has extirpated all elephants, tigers and wild cattle from Doi Inthanon and Doi Suthep National Parks, northern Thailand;
- between 1981 and 2000, hunting has resulted in the loss of all gibbons and siamang from Kuala Lompat, Krau Wildlife Reserve, Malaysia;

- all of the primates and hornbills have been extirpated from Kubah National Park, Sarawak, Malaysia as a result of hunging;
- between 1978 and 1993, the number of crested black macaques in Tangkoko Duasudara Nature Reserve, Sulawesi, Indonesia declined by 75%, anoa and maleo birds declined by 90%, and bear cuscus by 95%. All were due to hunting.

The trend is not unique to Asia, however:

- over the past 50 years, hunting has extirpated many species of large mammals from Kilum Ijim, Cameroon;
- in parts of the Okapi Reserve, Democratic Republic of Congo, duiker populations have been reduced by 42% because of hunting;
- the hunt in Banyang-Mbo Wildlife Sanctuary, Cameroon has switched from being duiker-dominated to rodent-dominated in the past five years;
- in 23 heavily-hunted sites in Amazonia, wildlife densities have been reduced by an average of 81%.

In reality, in most areas the only real protection is lack of access, irrespective of the legal status of the land. For example, land status notwithstanding:

- in Sarawak, density of primates, ungulates and hornbills is directly and inversely correlated with the degree of access;
- at 25 sites across Latin America, Africa and Asia, hunting rates in the sites were significantly correlated with human population density within or around sites.

Implications of unsustainable hunting for the ecological integrity of tropical forest protected areas

The animals hunted first are usually the large mammals and birds, which pollinate flowers, disperse seeds, and browse on plants. In some Central African forests, up to 75% of the plant species depend on animals for seed dispersal. The effect of the loss of those animals will have on the biodiversity and ecological functioning of the forests is unknown, but is likely to be significant. Hunting can have other effects on the biological community. For example, in India, tigers are sometimes hunted illegally but in many parks, they are not. In some parks, however, up to 90% of the prey animals of the tigers have been hunted illegally; that in turn results in loss of many of the tigers.

Implications for local peoples

Loss of wildlife has impacts on the local forest communities who rely on it for their subsistence lifestyle. The people who suffer most as the forest is opened up are the remotest forest people; these are often the people living on less than a dollar a day, and who have few or no alternatives. In extreme cases, this can lead to drops in protein consumption; for example, the protein intake of the Yuquí Indians in Bolivia dropped from 88g to 44g per person per day after major immigration by colonists.

Some forest peoples also rely on selling wildlife as one of their few sources of income. This issue is highly complex and nuanced, but local sales (e.g., to local villages within walking distance of the hunter's village) of some fast-breeding species might be sustainable in some areas. It is the large-scale, long-distance, capitalized commercial

trades involving middle men which are so highly damaging to wildlife populations, and to local communities who depend on them.

Solutions
Solutions are complex, and must be individually tailored to each area, with its own very specific mix of biological, social, cultural and political conditions. In all cases, and whoever the management authority (be it the local communities, government, other agency, or combination of them all), essential components of a successful management programme are:

- a high appreciation amongst all parties of the problem, and of the need to address it;
- some clearly understood regulations (e.g., on hunting by outsiders; hunting for subsistence or sale); and
- effective management capacity to implement the regulations.

Food for thought: Bushmeat utilization and protected areas in Eastern and Southern Africa

Tom Milliken, TRAFFIC Eastern and Southern Africa

TRAFFIC has conducted research on bushmeat in Botswana, Kenya, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe.

Bushmeat use spans a wide variety of species, from insects to elephants, and has direct impacts upon the ecological integrity of most protected areas in the region. Some bushmeat comes from legal sources such as licensed hunting, culling and cropping schemes, and from game ranching. However, illegal acquisition and trade are the norm.

Bushmeat is used by a broad cross-section of society, ranging from hunter and gatherer communities to rural farmers to urban professionals. In every country surveyed:

- demand for bushmeat is increasing;
- supplies of bushmeat are decreasing;
- bushmeat prices are increasing.

This combination spells disaster for the future of populations of many species across the region.

Other trends include:

- hunting techniques have been revolutionized to increase yields and make the harvest more commercially viable;
- as larger species decline, consumers turn to smaller, more prolific, animals. This can be characterized as being an increasing trend to the use of “snack fauna”;

- bushmeat is increasingly seen as representing money, and incentives to harvest bushmeat commercially have grown. People's financial needs are met more readily through selling bushmeat than through livestock;
- urban centres are increasingly turning to bushmeat, creating lucrative markets and country-wide demand structures.

What is being done?
State authorities are generally unable to exert effective management, including protection, outside protected areas, and often within them as well. Many enforcement officers, courts, and society at large do not perceive bushmeat to be a priority. An additional problem is that wildlife is essentially a free resource, with no clear ownership.

One solution which is being applied within the region is community-based natural resource management. Under this scheme, user rights are transferred to local communities, and wildlife benefits devolved to them. This often leads to improved local wildlife management. The best case scenario is when illegal bushmeat demand is cancelled out by legally-derived benefits from wildlife.

TRAFFIC's involvement in the issue
The core relevant activities of TRAFFIC within the region are:
- conducting ongoing research and monitoring;
- promoting awareness, particularly with potential cross-sectoral partners;
- developing better law enforcement tools;
- addressing important policy issues.

What can be done?
Harnessing cross-sectoral action is key to finding successful solutions. Areas in which positive actions could be conducted include:
- enhanced regulation. This involves developing effective methods for identifying meat; providing law enforcement training and assistance; and building awareness within the judiciary and public prosecutors;
- meeting the demand for bushmeat, by replacing illegal bushmeat with sustainably harvested bushmeat from ranches. This requires effective production and marketing policies, and increased monitoring and regulation of licensed outlets

Conclusion
The bushmeat issue in Eastern and Southern Africa is:
- a human issue with deep social and cultural dimensions;
- an integral part of the struggle for food and livelihood security by the region's people;
- an escalating trend producing profound ecological consequences.

Now is the time to act.

Potential solutions: multi-faceted programmes to take hunting pressure off protected areas in Sarawak, Malaysia

Melvin Gumal, Wildlife Conservation Society, Malaysia

Background to wildlife management in Sarawak

Sarawak is the largest state in Malaysia. It is relatively stable, and has a democratic government with elections held every five years. Its human population is 2.07 million, or about 17 people per km^2. There are 27 ethnic groups, and 51.9% of the population is rural.

Sarawak's land area is approximately 124,000 km^2. In 1996, 82% of the land was under some form of forest cover, and 50% under the Permanent Forest Estate.

Political support for wildlife conservation in Sarawak is strong. Policies are government-led. In 1994, the Sarawak Government invited the Wildlife Conservation Society (WCS) to work with them to prepare "A Master Plan for Wildlife in Sarawak", i.e., a comprehensive policy, prescriptive, cross-sectoral plan on conserving wildlife across the State. The Master Plan was officially submitted to the State Government in December 1996, and officially adopted by the State Cabinet in January 1997. A "Wildlife Master Plan Implementation Unit" was created that year, and it led to major legislative and other changes in 1998.

The Master Plan and its implementation by the Sarawak Government included a multi-faceted programme to reduce hunting pressure on parks. Core components were:

- controls of shotgun cartridges;
- banning wildlife trade of animals taken from the wild;
- education programmes;
- enforcement and patrolling;
- improved prosecution processes;
- formal participation in protected area management by local communities;
- development of alternative sources of protein and revenue for rural communities dependent on wildlife.

The hunting picture prior to 1997

Approximately 60,000 legally registered shotguns were in the State, with most being in the major towns of Kuching, Sibu, Serian, Baram, Kapit, Bintulu. In 1995, 2.5 million cartridges were imported, and 88% of all hunted animals died by gunfire.

In interior communities, wild meat was eaten in at least 20% of all meals, with the figure rising to 67% in remoter areas.

Prior to 1997, most protected areas were subject to legal and illegal hunting. This fell into the following main categories:

- legal subsistence hunting of unprotected species by people with gazetted rights;

- illegal hunting of totally protected species, or for trade, by people with gazetted rights;
- illegal hunting at non-designated areas within protected areas by people with gazetted rights;
- illegal hunting for subsistence or trade by local people without gazetted rights;
- illegal hunting by people from logging camps or towns, the hunting being for any combination of subsistence, sport and trade;
- hunting by Government staff, or for them by local people with gazetted rights.

Wildlife management measures for controlling hunting in protected areas

Following adoption of the Wildlife Master Plan in 1997, many measures aimed to protect wildlife in protected areas from unsustainable hunting and wildlife trade have been implemented. The main ones have been:

- cartridge controls. The number of cartridges which people can buy has been restricted to ten per gun owner per month. This has resulted in total imports declining from 2.5 million in 1995 to 0.5 million in 2000. Surveys of the 18 largest District Offices in the State showed that from 1997 to 2001, 50% of the Offices reported reductions in sales. The largest reductions were in major towns – Sibu by 70% and Miri by 78%. Black-market prices of cartridges increased from $0.40 to $7.00. Other results of the strict cartridge controls include: a probable decline in sport hunting; people focusing their hunting more on larger animals (especially bearded pigs) as it means more meat per cartridge which reduces pressure on vulnerable species such as primates and fruit bats; and potentially more wildlife in the permanent forest estate for local people, which might in turn reduce hunting pressure on protected areas;
- passing by the State Parliament of the Wild Life Protection Ordinance 1998. Among its many measures was a total legal ban on all commercial sales of mammals, birds, reptiles and amphibians, their parts or deivatives if the animals was taken from the wild. This plus the National Parks and Nature Reserves Ordinance 1998 also authorized local communities to become involved formally in management of protected areas, and to receive benefits from them;
- education. Multi-faceted education programmes have included press releases, mobile exhibitions, posters and brochures in a range of formats and languages, tailor-made education programmes in rural communities, and education packs for schools and rangers;
- enforcement and patrolling. This has led to greatly increased seizures of wild meat under the new law. Amounts seized have been: 1,025 kg in 2001; 198 kg in 2002; and 135 kg in 2003 (up to September);
- better prosecution procedures. These have been facilitated by creation of a DNA library, and conducting training courses for rangers on wildlife identification, and more detailed courses for selected senior staff with potential to be expert witnesses. This has resulted in the seizure of three vehicles; issuing of 30 compounds and nine court cases in 2001; seizure of three vehicles and five shotguns and issuing of 13 compounds in 2002; and three arrests and five summonses to date in 2003;

- where appropriate, testing schemes to develop alternative sources of protein and revenue for local communities. A pilot programme for alternative protein at Mulu National Park has proved problematic due to cultural taboos and inertia, although programmes for ecotourism and loofah production at Batang Ai National Park have met with greater success.

Hunting management in forest concessions surrounding Nouabale-Ndoki National Park, Northern Republic of Congo

Antoine Moukassa, Wildlife Conservation Society, Congo

The Republic of Congo covers an area of approximately 342,000 km^2. Of that, 63% is covered by forest and 11% is classifed as protected area, but only 4% is under any form of wildlife management programme.

Nouabalé-Ndoki National Park and surrounding logging concessions

Covering an area of just under 4,000 km^2, Nouabalé-Ndoki National Park is one of the largest parks in the forested regions of central-west Africa, containing almost 2 % of all Congo's forests. The Park is rich in flora and fauna, containing many species of large mammals, including elephants, western lowland gorillas, chimpanzees and leopards, more than 300 bird species, 1,000 species of plants and several different forest types.

The spread of commercial logging around the periphery of the Park has resulted in increasing human populations around the Park and increased access to forests and markets. Traditional hunting technology has been replaced by modern techniques, thereby increasing the hunting rate. The combined result has been the development of a commercial wildlife trade, which has increased the threat to the wildlife of the Park.

To try to manage unsustainable hunting and commercial wildlife trade, under a Protocol signed in 1999, an extremely successful collaboration was established between:

- Wildlife Conservation Society (WCS);
- Ministry of Forests and Environment, Government of Congo;
- Congolaise Industrielle des Bois (CIB), a private timber extraction company;
- Local peoples.

The objective of the programme is:

- To elaborate, implement, and monitor a wildlife management system in logging concessions around the Nouabalé-Ndoki National Park.

The project comprises four main components:

Wildlife law enforcement

This is done by locally-hired, highly-trained ecoguards. Core activities are:

- prohibition of the use of logging concession roads and trucks to transport bushmeat;Enforcing the system of zoning, especially prohibition of hunting in protected zones;
- prohibition of hunting of legally protected species;
- prohibition of the use of snares as a hunting technique;
- enforcement of the legal requirements to register guns and to pay for hunting permits.

Zoning
The concession has been divided into zones, with the aims of supporting local community tenure systems, and conserving wildlife. The zones are:

- seasonal zones for nomadic people;
- hunting zones for local people and CIB employees;
- protected zones (including clearings; bais; tourism viewing areas and reservoirs);
- sacred sites.

Conservation education
This is done to develop understandings of conservation and the reasons for the different management programmes amongst:

- local people;
- hunters;
- logging company employees;
- local students.

The education programmes are conducted through individual contacts, meetings, nature clubs, films and television.

Alternative activities
To reduce people's dependence on wildlife for protein and income, alternative, subsitutes for both are being developed. These have involved:

- identifying alternative potential sources of animal protein;
- promoting traditional activities for subsistence;
- advising the logging company on ways to provide affordable domestic protein to its employees.

Research, ecological and socioeconomic monitoring
This aims to collect data relevant to all aspects of hunting, from the field to consumers. Specific activities are:

- reconnaissance surveys of large mammals, and of human activities;
- monitoring and observation of forest use, especially in and around clearings;
- monitoring and evaluation of law enforcement efforts;
- market surveys, recording the following data for all wildlife being sold: species; number of animals; weight; age/sex; hunting technique used; reproductive condition; price; and cultural value of the animal(s);
- household food surveys, recording composition of their meals, and daily cost of different food items;

- demographic surveys, noting the number of inhabitants in each household.

Difficulties of wildlife management
The programme has been very successful, as evidenced by the high densities of large mammals throughout the concession. Some difficulties remain, notably:

- elephant-human conflict in agriculture zones;
- demographic growth in the different human communities;
- adoption of new strategies by poachers.

Conclusion
This approach gives us hope that we can extend conservation beyond the borders of protected areas, through involvement of the private sector, local communities and local NGOs, in ways which both guarantee sustaining livelihoods of local traditional communities, and also conserving wildlife populations in the face of mounting hunting pressure.

Management of hunting in the Amazon: Learning from the experiences of fishing management by local communities in Mamirauá and Amanã Reserves

Helder L. Queiroz, Mamirauá Institute for Sustainable Development, Brazil

Mamirauá and Amanã Sustainable Development Reserves are contiguous with each other, and are located in Amazonas State, Brazil. Amazonas State is at the heart of the Amazon Region. It has the lowest rate of deforestation and is in the best state of preservation of the region.

Mamirauá Sustainable Development Reserve:

- covers a total area of 1,124,000 hectares;
- is an IUCN Category VI protected area;
- was gazetted in 1990;
- entirely comprises flooded forests, with hundreds of small lakes;
- is characterized by very high levels of biodiversity and biological richness;
- contains many rare, vulnerable or threatened species;
- conservation activities are mainly concentrated in one Focal Area.

Amanã Sustainable Development Reserve:

- covers a total area of 2,350,000 hectares;Is an IUCN Category VI protected area;
- was gazetted in 1998;
- mainly comprises non-flooded, tall forests, and its main feature is Amanã Lake;
- is characterised by very high levels of biodiversity and biological richness;
- contains many rare, vulnerable or threatened species;
- conservation activities are mainly concentrated in one Focal Area.

All of the information presented below comes from the focal areas of the reserves. Between them, these cover a total area of 550,000 hectares. The number of inhabitants in the Mamirauá and Amanã focal areas are 6,500 and 2,500 respectively.

The information presented here is drawn from many years of studies by different researchers working at Mamirauá and Amanã Reserves, most notably:

- research on hunting patterns in three sites in Mamirauá Reserve, conducted by Pedro Santos from 1994-1996;
- research on hunting patterns in one site at Amanã Reserve, conducted by Leonardo Fleck from 2001-2002;
- research on the patterns of use of faunal resources in 10 sites at Mamirauá and Amanã Reserves, conducted by João Valsecchi from 2002 to the present time.

Results: Different strategies and adaptations

Hunters in the flooded forests of Mamirauá maintain a relatively high catch per unit effort of 0.84 kg/man hour, and hunt a wide diversity of animals – 55 species. Hunting pressure is not uniform, however, with strong pressure on the preferred animals: more than 71% of the hunted biomass comprises five species.

The catch per unit effort in the non-flooded forests of Amanã is lower, at 0.74 kg/man hour, and the diversity of animals hunted is less, at 27 species. Hunting pressure on the preferred animals is even greater, however, with 87% of the hunted biomass coming from only five species. Living in the flooded forest, about 90% of the protein intake of Mamirauá's inhabitants comes from fish, while more than 65% of the protein of Amanã's inhabitants, being in a non-flooded environment, comes from wildlife.

In the flooded forests of Mamirauá, more than 50% of the hunts are opportunistic, carried out during fishing expeditions or during work days in the gardens. At Amanã, more than 70% of the kills are made during expeditions organized specifically to hunt for meat.

The fact that hunting pressure is focused on just a few species is a possible source of concern. The species which are the main targets of hunters are:

- mammals: ungulates, large rodents and primates, and in the flooded forest also manatees and capybaras;
- reptiles: caimans, river turtles and tortoises;
- birds: cracids.

Despite the fact that the local settlements have been there for a long time, most of the hunting is apparently stable through time, and there are few cases of species displacement or substitution. This might indicate that hunting can be sustainable under certain conditions. This might be due to the combination of:

- the large seasonal variation in water levels in rivers and lakes throughout the year, which results in hunting seasons; and
- the large areas of continuous undisturbed habitats, which might provide allow for high replacement or recruitment rates, either by births or by immigration from neighbouring zones.

A positive local experience: fisheries management
Management of hunting in Mamirauá and Amanã has not yet been done systematically. But fisheries management has been done very successfully, and can teach us some lessons which might be applied to hunting management.

Fisheries management programmes were initiated in four villages in 1998, and today the programme is scattered across much of both reserves. The most important species exploited is the pirarucu (Osteoglossidae), which is officially protected in Brazil and is legally caught only in this part of the Brazilian Amazon.

Under an agreement between the managers and the local fishermen's associations, local fishermen offer their traditional knowledge and agree to conform with the management regulations, in exchange for technical support, scientific knowledge and investment for infrastructure and operations from the management authorities.

The core rules are that fishermen must respect:

- a minimum capture size of 1.5 meters;
- a six month closed season; and
- a zoning system.

A monitoring programme by both local fishermen and scientists involves counting fish when they came to the surface to breathe, and mark-recapture experiments. These have recorded a consistent decrease in the number of fish caught, but an increase of more than 350% of local stock size over a four year period, hence a major increase in total biomass caught. Hence, the income generated in the three months of the pirarucu fishing season has increased by more than 300% over the four year period.

Possible goals for a hunting management programme
Scientific knowledge gathered so far allows researchers and technical staff to formulate management proposals for some hunted wildlife species, either through sustainable use, or total protection. Further research has to be conducted to refine current proposals, and to establish monitoring techniques. In addition, a clear legal framework has to be developed to support such management.

Species for which data indicate that sustainable use might be feasible are:

- caimans. After five years of total protection, the local population of caimans recovered quickly from previously-depressed levels, suggesting that removal experiments may be performed under supervision;
- peccaries. The age structure of the population, as indicated by tooth-wear analysis, indicates that certain age and sex groups could be exploited under supervision;
- river turtles. The population recovery of the three most important species in the last six years suggests that the supervised removal can be developed in the river beaches and lake shores.

By contrast, between 1994 and 2003, a decrease in the catch of manatees has been recorded. This combined with the lack of information on the species means that no harvesting of these animals should be allowed at present. The population structure is still poorly known; hence, protection and environmental education are more important now than the sustainable use of the species.

Before any active management and sustainable use of local fauna can be implemented, new legislation is required since Brazilian law protects wildlife against any form of human use. In more recent years, the possibility of faunal management in areas protected areas for sustainable use (IUCN Category VI) has been recognized, but regulatory legislation has yet to be enacted, and is urgently needed.

Use of traditional belief systems in reducing bushmeat hunting in Ghana: An African solution to a conservation crisis

David Kpelle, Okyeame Ampadu-Agyei and Mohammed Bakarr, Conservation International, Ghana

Background to wildlife management in Ghana

Ghana has a land surface area of 239,000 km^2, in which live 19 million people, speaking six main languages. Traditional authority systems are stable, and include traditional conservation practices. Wildlife is conserved in both protected areas, and also sacred groves.

Protected areas of Ghana can be broken down according to the IUCN categories to comprise:

- 1 Strict Nature Reserve;
- 7 National Parks;
- 2 Wildlife Sanctuaries;
- 6 Resource Reserves.

Between them, they cover a total area of 13,852.5 km^2, or 5.6% of the total land surface.

Wildlife is managed under a broad legal framework, including the Wild Animal Preservation Act 43, 1961, Wildlife Res. Reg. L.I 710, 1971 and Wildlife Conservation Reg. L.I. 685, 1971. These prescribe restrictions on hunting, a closed hunting season (1st August to 1st December), the need for export permits for wildlife, and other regulations concerning bushmeat.

The single greatest threat to Ghana's biodiversity is the hunting of wildlife for bushmeat. Estimates are that about 385,000 t of bushmeat, worth approximately US$350 million, are harvested every year. In 2001, even during the closed season some 3,000 large mammals were killed for bushmeat. Restaurants in major urban areas serve bushmeat. The main methods used to hunt are guns (60%) and chemicals (32%). In addition to local

consumption, bushmeat from Ghana is exported, including to London, UK and other parts of Europe where entire suitcases and travelling bags packed with bushmeat have been seized.

African traditions as a means of reducing hunting
One way of involving all Ghanaians in the efforts to reduce hunting is through the totem system. The word "totem" arose among North American Indians, and refers to a vegetable or animal revered by individuals, particularly groups of people or tribes, as sacred. In Ghana, the totem system can be viewed at many levels: through traditional rulers, clan members, social clubs, political parties, or at national level.

Central to the concept of totems in Ghana is that of sacred animals. Preserving totem animals appeals to Chiefs, their lineage and leadership authorities. Conservation International (CI) has had a campaign in Ghana, the focus of which is to appeal to people to re-awaken their culture by protecting totems. The core result has been that 35 Ashanti chiefs have banned the most destructive types of hunting throughout the region.

Human health concerns and hunting
The focus of the campaign linking human health concerns and hunting has been raising awareness about the use of chemicals to hunt animals, and the health impacts of doing so. The result of the campaign has been a consumer boycott, resulting in 92% of local restaurants stopping selling bushmeat.

Government policy and enforcement
The focus of the campaign on government policy and enforcement was to lobby key officials, informing them of the then disincentives for staff to enforce the law. Specifically, the penalty for killing a mona monkey was 50 cents, but a poacher could earn $700 by selling one such monkey for export. The result of the campaign has been new restrictive requirements that bushmeat being exported must be certified. X-ray machines in Ghana and UK will soon be used to screen luggage for bushmeat.

Key elements of the CI strategy
Core to the strategy is that the programme has been run by a coalition of partners, including government, research institutions, traditional authorities, NGOs and the media.

A core aim was to raise awareness greatly through publicity. This was done through a massive media campaign, which ran from February 2001 to August 2002, including 22 newspaper articles, 12 radio interviews and eight television interviews (including the BBC), and production of large numbers of posters and t-shirts.

Lessons learned
- Appealing to cultural traditions is an effective way to mobilize support for conservation activities.
- Coalition-building requires strong leadership and flexible funding to achieve results.

- CI's focus on field-driven conservation strategies is successful in gaining local buy-in.

Recommendations

- Wildlife laws in Ghana need to be reviewed.
- Capacity-building programmes for traditional authorities are required.
- Different socio-cultural and political groups should be involved more fully in future programmes.
- Education and awareness programmes need to be managed in a way so that the knowledge is disseminated sustainably.

Lessons to be learned from exploitation of marine ecosystems

Callum Roberts, University of York

Fishing and hunting for food have much in common. We have a long history of trying to manage fisheries that we can call upon in our efforts to manage hunting for meat. History tells us that attempts to manage fisheries on a species by species basis fail to deliver sustainability, and also fail to protect non-target species or ecosystem integrity. Recognizing this, the emphasis in fisheries is shifting towards ecosystem approaches to management, and the use of closed areas that are off limits to all fishing

Lessons from fisheries

It is theoretically possible to conceive of sustainable rates of hunting for any species. In reality, however, for many marine and forest species, there is no such thing as sustainable hunting. Rates of sustainable offtake are extremely low for many species, and can easily be overshot if capture rates cannot be tightly controlled. Moreover, rudimentary hunting technology is no protection against overexploitation.

Fishing has eliminated the giants of the sea, just as hunting is destroying forest megafauna. They will not come back in places where over-fishing or over-hunting continues.

Other core lessons learned from fisheries which are applicable to hunting management are:

- calculating sustainable capture rates is expensive and data intensive. It is impossible for species that are rare, elusive or cryptic. It is also impossible in rich habitats like sea or forest;
- many hunting methods are unselective, and where any hunting takes place there will always be considerable by-kill of certain species, to the point that elimination of some species is inevitable;
- limits on capture of only a few species lead to the temptation to catch many other species, and continued by-kill of non-target species;

- full protection is easier to implement and enforce than partial measures, and is more effective.There is no such thing as a natural, intact ecosystem where there is fishing or hunting;
- a protected area that allows fishing or hunting throughout is not a protected area. No hunting zones are an essential minimum standard for any protected area.

Fully protected marine reserves
Fully protected marine reserves are being implemented worldwide to protect marine wildlife and sustain fisheries. Evidence that they are successful in conserving fisheries includes:

- reserves all over the world show dramatic increases in spawning stocks;
- once an area has been made into a reserve, fish therein grow to much larger sizes;
- fishers begin to fish close to reserves, indicating that spillover is occurring;
- fishers fish for less time and catch more than before reserves were set up.

An example of a successful reserve is at Apo Island, the Philippines. Ten per cent of the reef was closed to all fishing. Since 1980, the hook and line catch-per-unit-effort has increased ten fold.

One concern is that no-hunting zones will rob forest dwellers of their livelihoods. Fisheries experience shows that this is unlikely. Community managed marine reserves have promoted fishery sustainability and tourism in many parts of the world. Indeed, integrating no-take zones with hunting areas is the only way to ensure that hunting and wildlife have a future.

From ocean to forest
Management of harvests of fish and rain forest animals are not so different. Specifically:

- all protected areas should contain fully protected zone(s);
- spillover from fully protected zones is the key to management success in forests. This might involve establishment of hunting zones next to fully protected zones;
- some species should never be harvested.

Protecting India's parks amidst a sea of people

K. Ullas Karanth, Wildlife Conservation Society, India

Background to wildlife management in India

- India's human population is four times that of the U.S., but in an area one-third of the side of the U.S..
- The Indian economy is growing at 6% per annum, raising peoples' incomes and aspirations.
- More than 60% of the population are poor, living in rural areas, and rely on agriculture and animal husbandry for their livelihoods.

- More than 60% use wood/biomass for energy and shelter.
- "Natural" forests cover 10% of the country's land area, and "Parks" only 3%. "Effective Protection" covers only about 1%.

India has a strong history of wildlife conservation, although with some very different phases. The core ones were:

- late 19th Century: Forest areas decreasing due to conversion to agriculture;
- 1900-1950's: Direct wildlife destruction, due to bounty and sport hunting;
- 1950s-1960s: An emphasis on wildlife "conservation", although with limited success;
- 1970-1990: A strong emphasis on wildlife "preservation", which a much higher degree of success;
- 1990-Present: The strong focus on wildlife protection has been diluted, due to mission drift and loss of wildlife protection as the core goal, especially for protected areas.

India's parks: preventing collapse from the inside

Rapid steps are needed to arrestthe process of mission drift, and ensure that India's parks once again succeed in protecting wildlife. This necessitates a rational application of funds and of personnel. In addition, science-driven monitoring is needed, both for the biological parameters and also the level of threat.

Law enforcement is imperative; given the extremely high ratio of people to protected area size, local people have no incentive to protect the parks for their own benefits. Strong conservation leadership is required, and the non-material, non-economic values of parks should be emphasized.

Protecting wildlife in Kenya's parks in the face of high commercial hunting pressure

Paula Kahumbu, Kenya Wildlife Service

Background to wildlife management in Kenya

Kenya has 66 protected areas, including 23 National Parks, four Marine Parks, 24 National Reserves, six Marine Reserves, three Sanctuaries and six Wetlands. Between them, they cover 7.8% of Kenya's land area.

The Kenyan Government gives high priority to wildlife conservation. The Kenya Wildlife Service (KWS) was established as a parastatal, and is managed by a board of trustees. KWS retains all revenues for management, and the Director and Chairman are presidential appointments. KWS is a modern, mainly paramilitary, institution.

Wildlife Protection Units aim to provide security for wildlife countrywide through aerial and ground patrols. In addition, investigations are done into poaching; they lead to arrests and recovery of illegally held trophies, and prosecutions on wildlife crimes.

The Intelligence Unit collects information through informants, conducts covert investigations on illegal trade of trophies, disseminates information, and conducts surveillance and monitoring of banditry around protected areas.

Preventing ivory poaching and poaching other species for meat
Success of the Ivory Wars was assured because the public was on the side of the enforcers, the damage to elephants could be seen, and the data illustrated obvious population trends.

By contrast, halting poaching of wildlife for meat has often failed. This is because the opponent is difficult to hate, the tools are usually snares so are impossible to control, the local populace provides the markets for the meat, and data are inadequate to demonstrate the impact of hunting.

De-snaring – saving wildlife and providing data
De-snaring teams are employed to remove snares from protected areas. These operations reduce threats to wildlife, and also provide data on snaring intensity in different areas, habitats and seasons. In some parts of Tsavo East, more than 300 snares per month are removed.

Wildlife and livestock trends in the Tana River district
In spite of all of the efforts to reduce hunting, wildlife numbers in some areas continue to decline. For example, in the Tana River district, wildlife populations have crashed between 1977 and 2002, while the number of cattle and shoats (sheep and goats) has increased somewhat in the past ten years.

Hard lessons learned
Halting the slaughter will be difficult. It requires strong leadership, courage and principles. If we fail, the cost of re-establishing various species in protected areas might be prohibitive.

Communities have not benefited successfully from game cropping programmes. This was because:

- profits were below expectations;
- benefits accrue only to land title holders;
- regulatory structures were not universally accepted;
- monitoring has been weak.

Challenges to solving the problem of unsustainable hunting in Kenya's protected areas include:

- poverty;
- conflict between wildlife and humans;

- high levels of unemployment;
- cheap tools for hunting;
- the presence of wild meat markets;
- the lack of disincentives for potentially illegal hunters.

Before the problem can be solved, the following are required:

- a coherent wildlife policy;
- systematic data collection on wildlife status, and on potentially sustainable rates of offtake;
- accurate information on the dynamics of hunting and wildlife trade;
- a policy on land use;
- incentives that improve tolerance of wildlife;
- awareness programmes and ways to involve local communities, to generate public support for wildlife conservation;
- improved enforcement;
- improved legislation;
- increased funds.

Collaboration with local communities to manage protected areas in Zimbabwe and Zambia

Brian Child, Southern African Sustainable Use Specialist Group; Development Services and Initiatives, Zambia

In Zimbabwe and Zambia, the fundamental choice on more than 90% of the land is the cow and the plough, or wildlife-based systems.

- Cow-based systems involve heavy subsidies, marketing, the necessity for veterinary systems, and the landholder keeps all of the benefits.
- Wildlife-based systems are heavily taxed, produce State trophy fees and community revenue, and ownership is centralized; conventionally, the landholder gets no benefits.

Since 1985, shifts in underlying values have favoured wildlife-based systems. But is this being translated into real conservation incentives? A comparison of cattle and wildlife profits in Zimbabwe drew its results from a survey of 239,559ha cattle/game ranches and 131,484 mainly cattle ranches in Zimbabwe's south-east Lowveld from 1984 to 1986. Results showed that profits from wildlife clearly outweigh those from cattle. The comparative advantage, however, is not felt at the level of landholders; thus, they are not investing in wildlife. Wildlife is potentially more profitable, but it remains largely a State managed asset. This makes it uncompetitive in the eyes of local stakeholders who, therefore, opt to invest in agri-business.

One potential way to overcome this would be by changing the context of prices and proprietorship of wildlife-based systems. This would involving removing artificial constraints to markets, and allowing for product development. It would also allow

landowners the right to retain benefits, to manage the wildlife resource, and to use and sell it. This equates to removing red tape and bureaucratic interference, artificial restrictions on use, and licence fees and other taxes which are not imposed on livestock use.

Tools for making hunting work as a powerful conservation tool
Core components of using hunting as a powerful conservation tool include ensuring that its value is high through effective marketing, ensuring that its value is captured at the level of the landholder, and ensuring sustainability through quota setting and quality trophies.

To ensure profitablility, people must have rights to sell their property, and marketing must be open and competitive. Communities should select a joint venture partner who decides what to sell, advertises/tenders, shortlists, conducts interviews, and issues contracts. Collectively, these measures greatly improve prices and strengthen relationships with the private sector.

Improved marketing during the CAMPFIRE Programme in Zimbabwe meant that from 1990 to 1993, average income increased from Z$1,000 to Z$ 9,000. Similar results have been shown in Namibia and Botswana. Rules of thumb are that a successful programme needs a 33% hunting turnover, and a 10% tourism turnover of $1,500/bed/year. The benefits derived from the process include organizational development, household benefits and community projects.

Zimbabwe's CAMPFIRE Programme depends heavily on safari hunting, with more than 60% of revenues coming from elephants. In the face of a doubling human population, elephant populations have doubled from 4,000 to 8-12,000. Elephants benefit 90,000 households, but trophy quality is maintained. To ensure rapidly increasing household income and also increasing wildlife populations, it is essential to monitor trophy quality.

Incentive-based conservation has led to a rapid increase in wildlife populations: Zimbabwe has had a four-fold increase in the number of animals hunted in the 15 years from 1984 to 1999. Between 1991 and 1999, Namibia has had a steady increase to 27,000 trophies.

Land ownership considerations
Considerably more land in South Africa is conserved by private than state landholders; this is driven by incentives as 61% of protected land is private. Communal Lands conserve almost as much land as state protected areas.

In the past 20 years, on private land in southern Africa:

- wildlife-based enterprises have replaced livestock monocultures on most non-agricultural land;
- wildlife numbers of the species concerned have quadrupled;
- the number of species involved has doubled;

- some species have been re-introduced to areas, including elephant, lions and rhinos;
- habitats have recovered.

Increasing the area of land available to wildlife is leading to increased wildlife populations. This has included springbok in north-west Namibia; the most recent surveys conducted in July 2001 confirmed that there are at least 75,000 springbok, higher than expected. Densities are still relatively low, approximately 75 animals per 5000ha, making harvesting problematic. The population of black rhinos has also increased from 1986 to 2000.

Conclusion
Hunting is a powerful conservation tool if benefits go to the landholders. Safari hunting is robust; there is little risk of over-use, since clients avoid areas that are over-used and where trophy quality is low.

The role of government in managing hunting and trade

Richard G. Ruggiero, US Fish and Wildlife Service,Washington, DC

To determine the role of governments in managing hunting and wildlife trade, clarification is needed on whether it is an international issue or the responsibility of local/national people and governments or some combination of them all.

It is an international issue because:
- biological diversity and the survival of endangered species are global interests;
- foreign countries often are markets for natural resources, thereby creating pressure on protected areas;
- the quality of life on the planet depends on intact ecosystems;
- political borders do not limit species or ecosystems.

Action at local level can be important in having wider international impacts because:
- local actions have global environmental impacts;
- protected areas, especially those which border other countries, often do not contain the entire range of a species or ecosystem;
- threats to protected areas often come from other countries, either directly or indirectly;
- direct threats can be poachers or illegal loggers who cross borders to exploit wildlife/natural resources in other countries;
- indirect threats can be posed by markets in other countries that create demand for wildlife products, wood and other natural products from protected areas, thereby augmenting pressure on those protected areas.

Roles of developed economies and governments

The roles of developed economies and governments are:

- to support international treaties;
- to provide resources to international conservation efforts, both technical and financial;
- to enact effective domestic legislation to support international conservation;
- when invited, to support capacity building efforts;
- to promote and facilitate private sector engagement and responsibility, including amongst NGOs, local communities and industry.

Examples of international treaties of interest to the U.S. Fish and Wildlife Service are:

- CITES;
- Ramsar Convention;
- Antarctic Treaty;
- Environmental protection treaty with the Russian Federation;
- Migratory bird treaties with Canada and Japan;
- Migratory bird and mammal treaty with Mexico;
- Polar Bear Treaty;
- Pan American Convention.

Examples of U.S. domestic legislation relevant to hunting and wildlife trade in countries outside the U.S. are:

- African Elephant Conservation Act;
- Asian Elephant Conservation Act;
- Great Ape Conservation Act;
- Rhino/Tiger Conservation Act;
- Neotropical Migratory Bird Act;
- Endangered Species Act;
- Foreign Assistance Act;
- Lacey Act.

Roles of developing economies and governments

The roles of developing economies and governments are:

- to provide sufficient resources to protected areas, especially expertise and personnel;
- to establish national and regional policies that promote sustainable hunting and trade;
- to coordinate activities of relevant government departments, e.g., wildlife, economics, health, tourism, law enforcement, customs;
- to participate in and support international treaties/conventions;
- to develop an informed and supportive constituency for conservation;
- to promote leadership in government departments and the private sector to develop and support hunting and wildlife trade regulations;
- jointly with local partners, to develop management strategies and plans that mitigate the effects of illegal, unsustainable hunting.

Challenges to be met

The whole issue of management of hunting and wildlife trade is so complex, it poses many challenges. These include:

- governments in developed countries sometimes do not meet their obligations to international conservation;
- developing economies might have the personal resources and expertise, but the economic background and political will are often inadequate;
- competing demands for the support of human populations are enormous, and often antagonistic to support for wildlife conservation;
- maintaining the balance between economic justification for wildlife conservation, which involves use, and nature's aesthetic value to humankind, is often difficult;
- war and civil unrest, along with the proliferation of arms, pose enormous threats;
- poverty and lack of economic alternatives often force people to over-exploit wildlife and compromise parks.

People's attitudes supporting conservation are essential. Moreover, human population growth and competition with wildlife might be the ultimate determinant of the viability of wildlife populations.

Emerging issue statement arising from the sessions

Hunting and commercial trade in wildlife from many protected areas across the tropics and sub-tropics are rapidly increasing, unsustainable, and many aspects are illegal.

Demand for wildlife is increasing rapidly due to increases in the number of consumers, increasing buying power amongst urban consumers, and increasing commercialization of the hunt. The ability to meet the demand is facilitated by increased access to protected areas, and greatly improved hunting technologies.

Supply of wildlife both inside and outside protected areas is diminishing due to unsustainable hunting and decreasing areas of habitat; this is often reflected by an increase in price.

The problem is exacerbated by inadequate management capacity (personnel, training, infrastructure and budgets), whether the management authorities are the local communities, governments or other agencies.

An unintended consequence of some international and national development programmes and resource extraction activities has contributed to the magnitude of the problem, as have political instability and deteriorating economic conditions in many tropical countries.

Hence:
Unsustainable hunting and wildlife trade pose significant immediate threats to wildlife populations in many protected areas throughout the tropics, especially in systems where wildlife productivity is low.

A wide range of species, even those not currently identified as threatened, are at risk of local extinction as a result of unsustainable hunting across a significant proportion of protected areas across the tropics.

The loss of wildlife from protected areas due to unsustainable hunting has adverse effects on the biodiversity and ecological functioning of those areas, and hence of their conservation role.

Such loss often has adverse impacts on rural peoples living in and around protected areas, many of whom depend on wildlife for their livelihoods. The people most affected are often the poorest, and most marginalized sectors of society.

Solutions must be scientifically based, and specific to the local biological, social and political conditions.

Unsustainable hunting can be addressed either by restricting hunting to certain species and/or zones, or by providing alternative incentives for protection, e.g., through ecotourism, or safari hunting of certain species.

Commercial wildlife trade must be curtailed because it is extirpating wildlife from many protected areas throughout the tropics and sub-tropics.

Participation of local communities is crucial to seek solutions most likely to succeed in conserving wildlife, and in meeting peoples' subsistence and economic needs.

Capacity building of protected area managers is crucial, whether they be local communities, governments or other agencies, to develop and implement strategies to manage hunting in protected areas.