

Forests, people and wildlife: challenges for a common future

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An overview of conservation issues affecting the successful coexistence of forests, people and wildlife.

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In addition to providing people with wood and other plant products for food, construction and income, and ecosystem services such as freshwater, soil protection and climate regulation, forests are also major habitats for wildlife. Forest wildlife likewise provides both products (e.g. honey, wild meat, even edible insects [see article by Vantomme in this issue]) and ecosystem services (e.g. pollination, seed dispersal). Forests and wildlife together provide a basis for commercial and/or recreational activities such as hunting, photography, hiking and birdwatching. On a global scale, the goods and services provided by forests and forest wildlife are worth many billions of dollars. Added to this is their cultural and spiritual value which cannot easily be expressed in monetary terms.

This article summarizes some of the main issues and challenges to be considered in managing forests, people and wildlife so that all three benefit.

THREATS TO FORESTS AND FOREST WILDLIFE

Despite their value, or often because of it, even protected forests and wildlife face a formidable array of threats attributable to people. These include:

- conversion of forest to agriculture;
- overgrazing of woodlands;
- unsustainable harvesting or collection of wood, fuelwood and non-wood forest products;
- excessive hunting;
- illegal wildlife trade;
- encroachment of human settlement;
- tourism and recreational pressure;
- mining and fossil fuel extraction;
- forest fires.

The International Union for the Conservation of Nature (IUCN, 1999) defined three categories of threats to protected areas:

- removal of an individual element of a protected area without alteration

Forests and forest wildlife offer people not only products and ecosystem services but also recreational activities such as nature tourism, photography, hiking and birdwatching



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Wildlife harvested for bushmeat includes certain reptiles, including this tropical American edible iguana

of the overall vegetation structure – for example, animal species hunted for the bushmeat trade, high value timber species and commercially important ornamental plants;

- overall impoverishment of the ecology of a protected area by, for example, persistent poaching, unregulated tourism and recreation or encroachment of human settlement;
- major conversion and degradation, for example, by the removal of forest cover, the routing of a major road through the protected area or the undertaking of mining operations.

There are two main drivers behind these threats: the increasing consumption of wealthier populations, which stimulates agricultural and industrial production, resource extraction and tourism; and poverty, which creates needs for land and resources, especially in developing countries.

These drivers are in turn related to factors such as population growth, economic growth, trade and development; legal and governance issues, including corruption; insecure land tenure; lack of scientific and technical capacity; international debt; economic and social inequality, including gender inequality; conflict and war.

These dynamics form the backdrop for any action to address the threats to forests and forest protected areas. The

centrality of threats in the thinking of conservationists is reflected in the development of Threat Reduction Assessment (TRA) as a simple and practical method of estimating the success of conservation measures (Salafsky and Margoluis, 1998). In essence, this approach involves identifying the threats to a given conservation area, developing responses to these threats and monitoring the degree to which the responses are successful.

OVERUSE AND TRADE OF WILDLIFE RESOURCES – THE EMPTY FOREST SYNDROME

Of the many threats that forest wildlife faces, none has had a more severe impact than unsustainable, unregulated and often illegal hunting and trapping for commercial trade in wildlife and wildlife products, including the pet trade, across the developing world. Wild forest animals captured and traded as pets include mammals, birds, fish, amphibians, reptiles (e.g. tortoises, lizards) and even spiders (e.g. tarantulas). Wildlife products include bushmeat and high-value commodities such as ivory, rhinoceros horn and tiger bone. Animals harvested for bushmeat include common ungulates, rodents, large birds and reptiles (alligators, crocodiles, snakes) as well as larger threatened species such as chimpanzees, gorillas, bonobos, wild pigs and elephants.

As a result of faunal depletion, the remaining primary tropical and subtropical forests, which still provide good habitat for wild animals, are widely becoming empty of large vertebrates (see also Box on

Ethical considerations in forest and wildlife management and conservation

Jeremy Bentham (1748–1832), an English philosopher, legal and social reformer and early advocate of animal rights, articulated a criterion for identifying individuals whose interests need to be considered: their ability to suffer. Singer (1995) expressed this ethos as follows:

The capacity for suffering and enjoyment is ... not only necessary, but also sufficient for us to say that a being has interests, at an absolute minimum, an interest in not suffering. ... So the limit of sentience (... the capacity to suffer and/or experience enjoyment) is the only defensible boundary of concern for the interests of others.

Among the animals affected by human activities in terrestrial ecosystems, those that are the most closely related to humans – large-brained, highly sociable species such as bonobos, chimpanzees, gorillas, orang-utans and elephants – suffer in ways that humans can easily imagine. Bonobos and chimpanzees, *nota bene*, share around 98 percent of their DNA with humans.

For the animals that experience it, suffering is not an abstract philosophical issue, but a harsh physical reality. Their interests therefore need to be considered. How this should be done is an important question for forest and wildlife conservationists and managers. In an ethically responsible world an obvious response would be to include ethical implications in the overall planning and management of human activities.



Crocodiles on sale in a fish market, Brazzaville, the Congo

p. 4). Forests thus deprived show not only shifts in the relative abundance of animal species, but also reduced seed dispersal and altered patterns of tree recruitment (Wright *et al.*, 2007) and may thereby be impairing the functioning of the globally important carbon sink provided by tropical forests (Brodie and Gibbs, 2009).

The Convention on Biological Diversity (CBD) Liaison Group on Bushmeat defines bushmeat hunting as the harvesting of wild animals in tropical and subtropical forests for food and non-food purposes, including for medicinal use (CBD, 2009). In Central Africa, an estimated 579 million forest mammals are consumed annually – up to 5 million tonnes of dressed bushmeat (Fa, Peres and Meeuwig, 2002). On Bioko Island, Equatorial Guinea, hunting has reduced primate populations by 90 percent in some areas and caused local extinction in others (Bennett, 2006).

Even in remote and protected areas, such as the Okapi Wildlife Reserve in the Democratic Republic of the Congo, the commercial bushmeat trade in markets hundreds of kilometres away threatens the survival of indigenous populations that depend on sustainable hunting for their subsistence and livelihoods (Pitman, 2010). In Africa the bushmeat trade is often facilitated by logging activities, because logging roads provide easy access to increasingly remote forests and

logging trucks are used for transporting bushmeat. Moreover, logging companies often regard bushmeat as a free food supply which relieves them of the responsibility to provide for their labourers (Nasi *et al.*, 2008; Poulsen *et al.*, 2009).

Unsustainable hunting and trade in wildlife for use as food and in traditional medicine are also serious conservation and development concerns in East and Southeast Asia, where the severity of the problem is related to high human population densities, a long tradition of consuming wildlife products for medicinal use (e.g. tiger bone for arthritis, snake bile as a tonic) and exceedingly rapid economic growth. In Viet Nam, 12 species of large animals have become extinct, or virtually extinct, in the past 50 years, mainly as a result of hunting. Every major protected

area in Southeast Asia has lost at least one species of large mammal to hunting, and most have lost many more (World Bank, 2005). Ho Chi Minh City, Viet Nam has an estimated 1 500 restaurants selling wildlife meat; every year 90 000 wild mammals are sold for meat in a single market in North Sulawesi; and 1.5 million live birds are sold annually in the Pramuka market of Jakarta (Bennett, 2006). When populations of a target species in one area decrease, markets seek their supplies from other species such as smaller mammals (e.g. rodents) or from other areas, causing ever-widening circles of loss.

Beyond the tropics, commercial wildlife trade also poses a threat to wildlife populations in Mongolia's temperate steppes and woodlands, as hundreds of thousands of Mongolians have turned to hunting wildlife – particularly for the large Chinese market – as one of the few available income alternatives in the post-Soviet era (World Bank, 2006).

In the Neotropics, the large-scale hunting of forest wildlife is still mostly within the limits of sustainability, mainly because of lower human densities. Species harvesting rates in relation to production have been found to be 30 times less in the Amazon than in the Congo Basin (Fa, Peres and Meeuwig, 2002). But even in this part of the world, the defaunation process is spreading rapidly (Box below).

Private industry, trade in wild meat and changing local subsistence patterns: an example from Ecuador

Between 2005 and 2007, the trade of 11 717 kg of wild meat (mostly pacas, white-lipped peccaries, collared peccaries and woolly monkeys) was recorded in a wholesale wild meat market in Pompeya, near Yasuni National Park in Ecuador. The market was developed near a road built to facilitate oil extraction in the national park, offering an opportunity for local Waorani and Kichwa indigenous people to trade with commercial dealers. Free transport provided by the oil company within the park indirectly facilitated the hunting activities. Prices for wild meat were up to two times higher than those for domestic animal meat. Almost half of the wild meat delivered to the market was bought for resale at restaurants in Tena, a medium-sized town 234 km distant (Suárez *et al.*, 2009).

International trade in wildlife

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) regulates international trade in endangered wildlife species and derived products. Yet the illegal wildlife trade thrives nonetheless.

China is the world's largest importer of wildlife products, with continuous demand for turtles, ivory, tigers, pangolins, snakes and many other species used for food or medicines. The world's second largest importer of wildlife products is the United States of America, which since 2000 has imported almost 1.5 billion live animals, mostly from wild populations in Southeast Asia (Rosen and Smith, 2010). Between 1992 and 2002, trade in wildlife and wildlife products in the United States increased by 75 percent, and it shows no sign of abating.

Because of the ineffective enforcement of CITES regulations in many countries, the illegal wildlife trade is fertile ground for organized criminal groups smuggling exotic animals, plants and derivatives in and out of CITES member countries with little risk of prosecution. For example, it has been estimated that around 5 tonnes of bushmeat per week are smuggled in personal luggage through Charles de Gaulle airport (Paris, France), not only for private consumption, but as part of a lucrative business involving high prices and a wide range of species, many of which are CITES listed (Chaber *et al.*, 2010). Although the exact dimensions of this type of trade are unknown, it is understood to be among the world's largest illegitimate businesses, after narcotics (Zimmerman, 2003; Rosen and Smith, 2010).

A high proportion of today's illegal trade in wildlife and wildlife products is conducted through the Internet, with thousands of CITES-listed specimens offered for sale online every week (IFAW, 2008). This trade poses a huge challenge for biodiversity conservation, a risk of introducing invasive species (often with disastrous effects) and enor-

mous potential for disease transmission to both humans and animals.

Indeed approximately 60 percent of human pathogens are known to be zoonotic, i.e. transmitted through animals, and since 1980 more than 35 new infectious diseases have emerged in humans, including HIV and Ebola viruses which have both been traced back to human consumption of infected African great apes (Karesh *et al.*, 2005; Rosen and Smith, 2010) (see Newman, Slingenbergh and Lubroth, following this article).

What can be done?

Although there is no single solution to the widespread overhunting of forest wildlife, three management components in general are needed to reverse unsustainable use: effective laws and law enforcement (see article by Nguiffo and Talla, this issue), awareness raising/education and the provision of protein or livelihood alternatives (Bushmeat Crisis Task Force, no date; CBD, 2009). In Cameroon, the Wildlife Conservation Society (WCS) and the Last Great Ape Organization (LAGA), a wildlife law enforcement NGO, have successfully worked with the government to reduce the illegal bushmeat trade through educa-

tion, law enforcement and the development of alternative protein and income sources. Perhaps most effective was the WCS collaboration with Cameroonian railways, which led to regular inspections on trains for illegal animal products. The trade has lessened greatly now that its main mode of transport is under scrutiny.

To control illegal trade in wildlife effectively at the national and international levels (and also illegal trade in plant products – see article by Tong, Schmidt and Johnson), there is a need for decisive support to CITES member countries in their efforts to implement and enforce adequate national legislation to fulfil their CITES commitments. Increased education, networking and capacity building are also needed in most developing countries (Milner-Gulland *et al.*, 2003; Rosen and Smith, 2010).

HUMAN-WILDLIFE CONFLICT

Humans and wildlife come into conflict in many different contexts. The problem is most pronounced in areas of high or growing human and/or livestock densities where wildlife still occurs in

To prevent damage by elephants, chilli pepper can be used as an innovative repellent



REINHARDT/GETTY IMAGES

Climate change – increasing the pressure on forests and forest wildlife

In addition to storing about half the total carbon contained in land ecosystems, forests host the majority of terrestrial biodiversity, mainly in the tropics and subtropics. Even moderate climate change puts some of this biodiversity at considerable risk. The rise in average global temperatures will influence the length and severity of seasons and the frequency and severity of floods and droughts, increasing the prevalence of fire and predisposition to pests and pathogens – with expected impacts on forest habitats and species. About one-quarter of vascular plants and higher animals on the globe are estimated to be at an increasingly high risk of extinction as temperatures rise by 2° to 3°C above pre-industrial levels. It is very likely that even more modest losses in biodiversity would affect ecosystem services (Seppälä, Buck and Katila, 2009).

As global average temperatures continue to rise, it is important to develop strategies to conserve species and habitats that are unable to adapt. Measures to reduce the impacts of other human pressures – which still exceed those of climate change in most cases – are also likely to help reduce the overall vulnerability of forest ecosystems to climate change. More radical measures for adapting forests and wildlife to climate change include modifying or newly creating habitats, translocating whole animal and plant communities and moving boundaries of protected areas.

significant numbers. It is especially pronounced in Africa, where it has serious implications for food security (FAO, 2009). Examples include elephants raiding crops, lions killing livestock, baboons stealing food, birds damaging crops, hippopotamuses threatening fisherfolk or crocodiles attacking villagers when they collect water from a river.

Efforts to manage the problem have evoked considerable ingenuity, such as the use of cloths, projectiles or bricks impregnated with chilli pepper to serve as a repellent to crop-raiding elephants. Because of continuing human population growth, economic growth and expansion of human settlement, and a likely amplification of competition for natural habitats and resources as a result of climate change (see Box above), the incidence of human-wildlife conflict will probably increase in the foreseeable future, requiring ever more attention.

FAO, in collaboration with the International Cooperation Centre of Agricultural Research for Development (CIRAD), the World Wide Fund for Nature (WWF),

the Zimbabwean Parks and Wildlife Management Authority and other organizations working in southern Africa, has developed a practical toolkit to assist rural communities in choosing the best possible options to prevent or mitigate

human-wildlife conflicts (see Le Bel, Mapuvire and Czudek, this issue).

ECOTOURISM – OPPORTUNITIES AND COSTS

Ecotourism has the potential to make a substantial positive contribution to the management and conservation of forests and forest wildlife (Williamson, 2006). Ecotourism destinations are generally in rural areas, which tend to be poorer than urban areas and to offer fewer employment opportunities. In such areas, ecotourism offers potential to provide income and employment for local people (Box below).

The International Ecotourism Society (www.ecotourism.org) defines ecotourism as “responsible travel to natural areas that conserves the environment and improves the well-being of local people”. It can be distinguished from general nature tourism by its emphasis on conservation, education, traveller responsibility and active community participation. Contemporary ecotourism encompasses a diversity of experiences ranging from luxury safaris for wealthy nature lovers, with plush accommodation

Ecotourism contributes to gorilla conservation and livelihood generation in Uganda

In Uganda, where approximately 60 percent of the estimated 720 remaining mountain gorillas live, the annual income from gorilla viewing treks increased from US\$113 million to \$400 million from 2000 to 2007, an increase of 36 percent per year (Rukundo, 2009). Uganda receives about 20 000 visitors per year to view the apes. In 2007, visitor permits brought in US\$4.7 million; hotels and services created 70 000 jobs; and revenue sharing funded 181 community projects – for clinics, schools, community centres, bridges, roads, maize mills and water access. Tourism now tops Uganda’s foreign exchange earnings (Redmond, Mapesa, and Rwetsiba, 2008).



A gorilla family – male, female and two young – in Bwindi-Impenetrable forest, Uganda

and motorized game viewing, to wilderness treks in which the participants travel by foot on rugged trails and sleep on the ground in small tents.

Eagles, McCool and Haynes (2002) identified three clusters of potential benefits from ecotourism:

- **enhancing economic opportunity**, for example, through increased employment, increased income, commercial opportunities for local suppliers, local manufacture of goods, new markets and foreign exchange, improved living standards, tax revenues, new skills and funding for protected areas and communities;
- **protecting the natural and cultural heritage**, which conserves biodiversity at the level of genes, species and ecosystems, brings out the value of biodiversity, propagates conservation values and contributes to protected area financing;
- **enhancing the quality of life** by promoting aesthetic, ethical and spiritual values, providing environmental education, improving intercultural understanding, stimulating the development of arts and crafts and raising the educational level of local people, thus helping them to value their own culture and environment.

Ecotourism unequivocally generates benefits for a range of stakeholders, for example national and international ecotourism businesses, operators of hotels and eating places, local food producers, local artisans and producers of curios for tourists, local tourist guides, and people and companies working in transport (from national and international airlines to local drivers) – not to forget the national and international tourists who benefit from the intrinsic value of the forest experience.

Ecotourism, however, also entails costs – economic, social and environmental.

Economic costs are generated by increased demand for expanded public services, such as road, health and security infrastructure, which results from the

presence of large numbers of visitors. The cost of protected area management may also increase by the need to service, manage and monitor tourism, but this in general can be compensated through levying park fees and additional income opportunities.

Social costs arise, for example, from excessive numbers of visitors who interfere with local activities; insufficient attention to the needs and required involvement of local people by governments that prioritize short-term economic gain from tourists; denial of access to resources in protected areas that have traditionally been important to local people; and large gaps in wealth between tourists and local people, which can result in exploitation of local people and indifference to their needs and concerns.

Tourism can result in many different forms of damage to the environment, plants and animals alike, such as disruption of ecosystems by infrastructure development, soil erosion, habitat degradation, water pollution, disturbance, injury and contagion with potentially harmful pathogens/diseases.

It is indeed at the centre of the concept of ecotourism that such detrimental impacts are avoided. If nature tourism activities are not based on the follow-

ing principles, they do not qualify as ecotourism:

- conscientious, low-impact visitor behaviour;
- sensitivity towards, and appreciation of, local cultures and biodiversity;
- support for local conservation efforts;
- sustainable benefits to local communities;
- local participation in decision-making;
- educational components for both travellers and local communities.

None of the above-mentioned problems are insuperable, and if ecotourism is well planned and managed it can often make a substantial contribution to the sustainable financing of a protected area and provide multiple socio-economic and ecological benefits. The prerequisites include solid marketing strategies to create access to sufficient numbers of clients in an increasingly competitive market. Making good use of tourist revenues by reinvesting them into improved management actions can contribute markedly to

Contemporary ecotourism encompasses a diversity of experiences ranging from luxury safaris to rugged wilderness treks; shown, horseback safari in Botswana





M. WILKIE

Ecotourism generates economic benefits for local guides and tour operators, and cultural and spiritual benefits for the national and international tourists who enjoy the experience (Thailand)

the long-term integrity of a protected area (see article by Bien in this issue). Particular efforts need to be made to ensure that economic benefits of tourism reach the poor (UNWTO and SNV, 2010).

Not all rural areas, however, are suitable for ecotourism activities. Planners should evaluate carefully whether ecotourism is an option in a given location and what kind is most promising by considering special features, existing infrastructure and past experiences. Heavy dependence on tourism revenues can also be risky because of fluctuations in visitor numbers as a result of economic and political change, social unrest or environmental disasters. Diversification of economic activities, for example by promoting non-wood forest products, is therefore advisable to avoid overdependence on tourism.

INTEGRATED CONSERVATION AND DEVELOPMENT – DOES IT ADDRESS THE PROBLEMS?

One approach for responding to the threats faced by forests and associ-

ated wildlife involves integrating the management of natural resources with economic development to improve the quality of life of rural people. Such integrated conservation and development projects (ICDPs) have been given a variety of designations, for example, “people-centred conservation and development”, “eco-development”, “grassroots conservation” and “community-based natural resource management”.

Community-based conservation can be a significant complement to conventional government-led protected area management and enforcement activities, especially in developing countries with limited budgets. When local people are involved in and benefit from the management of natural resources, they are more likely to support conservation efforts.

In adopting an ICDP approach, however, it is important to avoid certain assumptions. It should not be assumed, for example, that local people and their livelihood practices constitute the main threat to the biodiversity resources of a given area, since outside agents, such as commercial bushmeat hunters, may be a bigger threat. New livelihood options may not actually reduce human pressures on biodiversity if they are seen by the community as additional opportunities rather than alternatives to exploiting biodiversity. And the capacity of traditional approaches (e.g. providing jobs and opportunities for local people to produce goods and services for tourists) to generate sustainable benefits for local people should not be overlooked.

Reviewing ICDPs, Schreckenber, Luttrell and Moss (2006) recognized “the need to address concerns that the benefits from participatory forest management may not be sufficient to cover the costs imposed on poor communities, which raises doubts about the longer term viability of the approach”. The costs could include, for example, the disruption or curtailment of established patterns of resource use by local people.

Although the challenges remain high

and success depends on the context, the integration of conservation and development is standard practice today. New FAO projects in Central Africa and Mongolia, for example, are being designed with community wildlife management components. Some positive examples are described in other articles in this issue (see Alieu; Khatri; and Rawee Thaworn, Kelley and Yasmi). Increasingly, communities are demanding the rights to manage their natural resources. Some governments are responding by making the necessary policy and legislative changes to help communities receive the benefits from such transfer of responsibility. Such devolution, however, also implies a need to share the costs (see article by de Koning).

CONCLUSIONS

Since time immemorial people have benefited in a diversity of ways from forests and forest wildlife, but in the contemporary world much damage has been done to both forests and wildlife through unsustainable resource use, which is also often illegal. Unless measures are taken to curtail unsustainable and/or illegal resource use, the benefits from forest and wildlife will continue to dwindle, in many cases to the detriment of those who are already poor.

Experience suggests that breaking the supply chain is an effective way of reducing illegal and unsustainable exploitation of forest wildlife, but additional measures urgently need to be applied. These include improved law enforcement capacity, public awareness and education campaigns and generating benefits for local communities through employment and improved economic opportunities, such as in providing goods (e.g. local arts and crafts) and services (e.g. tourist guide services). Full involvement of local people in managing and benefiting from the products and services delivered by forests and wildlife is crucial for the sustainable conservation of these vital resources. ♦



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