

Take only photographs

Leave only footprints

**The environmental
impacts of**

Dilys Roe
Nigel Leader-Williams
Barry Dalal-Clayton

October 1997

**TAKE ONLY PHOTOGRAPHS, LEAVE ONLY
FOOTPRINTS:**
the environmental impacts of wildlife tourism

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ACRONYMS AND ABBREVIATIONS

ADMADE	Administrative Management Design for Game Management Areas
BMZ	Bundesministerium für Wirtschaftliche Zusammenarbeit
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CEP	Caribbean Environment Programme
CPAM	Cooperative Protected Area Management
EIA	Environmental Impact Assessment
GMA	Game Management Area
GNPS	Galapagos National Parks Service
ICDPs	Integrated Conservation Development Projects
ICDP	Integrated Conservation Development Project
IIED	International Institute for Environment and Development
IUCN	The World Conservation Union
LAC	Limits of Acceptable Change
LAU	Limits of Acceptable Use
LIRDp	Luangwa Integrated Resource Development Project
NGO	Non Governmental Organisation
NPCA	National Parks and Conservation Association
ODA	Overseas Development Administration
PAWM	Planning and Assessment for Wildlife Management
SCI	Safari Club International
TANAPA	Tanzania National Parks
UN	United Nations
UNEP	United Nations Environment Programme
VIM	Visitor Impact Management
WTO	World Tourism Organisation
WTTC	World Travel and Tourism Council
WTTERC	World Travel and Tourism Environmental Research Council
WWF	World Wildlife Fund/World Wide Fund for Nature
YHA	Youth Hostel Association

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EXECUTIVE SUMMARY

(1) Wildlife tourism is often used to link wildlife management with economic incentives to promote conservation, particularly in developing countries. It is also becoming an increasingly important component of the global tourism product. However, little research has been undertaken on the environmental impacts of wildlife tourism. This paper sets wildlife tourism in its global perspective, and reviews a broad range of different wildlife tourism initiatives and approaches to assess their associated environmental impacts.

(2) The growth in alternative forms of tourism has occurred simultaneously with an increased recognition of the need to implement the concept of sustainable development. Ecotourism¹ has been widely assumed to be inherently sustainable, although few attempts have been made to verify this assumption. Ecotourism incorporates environmental and cultural conservation objectives, and emphasises economic benefits to local communities. Hence, ecotourism would appear to be, and is increasingly presented as, a panacea for sustainable development. However, it also has the potential to be more environmentally damaging than mass tourism since it typically occurs in fragile environments and opens up previously undiscovered destinations to the mass market.

(3) Wildlife tourism can contribute enormously to the management of protected areas. Benefits include foreign exchange revenues, employment opportunities, improving awareness of conservation objectives and stimulation of economic activity. While protected areas are major destinations for wildlife tourists, private enterprise is playing an increasing role in the wildlife tourism sector. In addition, wildlife tourism is a major vehicle for realising tangible benefits of conservation for local communities with wildlife populations occurring on their land. However, the benefits accruing to local communities from tourism have so far been overstated.

(4) The type and magnitude of the environmental impacts associated with wildlife tourism vary with the type of tourist activity pursued. Some impacts are obvious and easily identifiable, while others are indirect and difficult to quantify.

Direct impacts include:

- disturbance of feeding and breeding patterns;
- increased vulnerability to competitors and predators;
- disruption of parent-offspring bonds;
- transmission of diseases; and, in certain cases,
- death of individual animals.

Indirect impacts include:

- habitat modification;
- increased collection of certain wildlife products for souvenirs; and
- impacts from associated infrastructure.

The significance of any impact will depend on its effect on the genetics and/or dynamics of particular populations or ecosystems – small populations of rare and/or slowly reproducing species will be affected more than large, widely distributed populations of common species. There is little clear

¹ Ecotourism is a subset of wildlife or nature tourism. The term has emerged as a buzzword, but there is much confusion surrounding its precise meaning. This issue is discussed in Chapter 1.

evidence linking the impacts on individual animals to effects upon populations. Therefore, the scale and acceptability of impacts are usually judged on aesthetic rather than scientific grounds.

(5) The nature and magnitude of the impacts of wildlife tourism depends on numerous factors including the type of tourist, the nature of the disturbance, the characteristics of the wildlife, the ecology of the area and the time scale under consideration.

(6) Strategies to manage the impacts arising from wildlife tourism may also be direct or indirect. Direct strategies include limiting the total numbers of visitors to an area, dispersing visitors; zoning; using fixed viewing points; and setting guidelines for minimum viewing distances. Indirect strategies are those that aim to modify the behaviour of tourists. One of the most important ways of achieving this is to educate visitors about the potential disturbance they can cause and to provide advice on how to reduce it.

(7) This study indicates clearly that it is not currently possible to make generalisations concerning the environmental effects associated with wildlife tourism. Whilst the environmental impacts arising from wildlife tourism are well appreciated, they are poorly understood - the available literature relating to environmental impacts of wildlife tourism shows little quantitative basis. At present, much of it is descriptive or anecdotal with little hard data or scientific analysis. Only a few case studies were identified that actually document the environmental impacts of wildlife tourism. Most studies have focused on the short-term effects of disturbance by tourists, and on individuals or species rather than on communities or populations. The impacts recorded are various, some being associated with the tourism industry generally (Chapter 2), while others are associated with wildlife tourism in specific areas (Chapter 4). Greater emphasis has been placed on the economics of wildlife tourism developments, and numerous studies consider the potential of developing wildlife tourism or ecotourism initiatives in a particular area. Very few studies have taken a retrospective look at the environmental impacts that have occurred as a result of any wildlife tourism.

(8) Proposals for wildlife tourism developments need to be considered on a case-by-case basis in order to determine the environmental impacts that are likely to arise. In order to develop effective policies and plans for wildlife tourism, further research is required in a number of areas, especially:

- the relationship between short- and long-term impacts;
- impacts on wildlife populations and communities rather than on species and individuals;
- the significance of different impacts;
- impact indicators; and
- prerequisites for successful local participation in wildlife tourism initiatives.

A framework is proposed to allow a standardised approach to monitoring the impacts of wildlife tourism in future.

CHAPTER ONE

INTRODUCTION

1.1 Research on Wildlife Tourism

Tourism based on wildlife is widely assumed to be inherently sustainable. Nevertheless, few attempts have been made to verify this assumption. The impact of tourists on the wildlife of certain East African game parks has been documented in some detail. However, little research has been undertaken on the environmental impacts of wildlife tourism internationally. Furthermore, the impacts associated with the recent upsurge in 'ecotourism' holidays have scarcely been considered. The need for more rigorous data on the impacts of ecotourism was identified at a workshop as follows:

"The recent wave of support for ecotourism has been based largely on anecdotal reports of impacts combined with unverified "*common-sense*" propositions such as the idea that ecotourism is ecologically benign because ecotourists are environmentally sensitive" (Lindberg 1992).

Most research carried out on wildlife tourism to date has concentrated on legally protected areas (e.g. Boo 1990; Hannah 1992; Wells and Brandon 1992; Giongo *et al.* 1993). Equally, wildlife tourism is not restricted to protected areas. Tourism, of both consumptive and non-consumptive forms, has been used successfully as an economic incentive to retain private land under wildlife management, and indeed to reclaim land previously used for other purposes (e.g. Cumming 1991). Furthermore, tourism has been used successfully as an economic incentive for community-based wildlife management on communal land around and outside parks and reserves (IIED 1994). However, few attempts have been made to clarify different types of tourist development. Most of the literature is descriptive in nature, with few attempts to learn about different forms of wildlife tourism or their impacts from case studies, either in developing countries or elsewhere, a view backed up by numerous other researchers (Healy 1992; Giongo *et al.* 1993; Pearce 1994; Aylward *et al.* 1996, Shackley 1996).

1.2 The Scope of this Paper

This study was commissioned to review the research undertaken to date on the environmental impacts of wildlife tourism. The aim of the study is to compare the environmental impacts associated with different scales and types of tourism initiative. The economic and social impacts of wildlife tourism are also very important, but are beyond the scope of this paper.

An extensive literature review was undertaken that included academic journals covering wildlife management and conservation, journals of the travel and tourism industry, and those journals produced by environmental organisations such as United Nations Environment Programme (UNEP); conference proceedings; discussion papers and published books and manuals. In addition, literature produced by bodies such as the World Tourism Organisation (WTO), the World Travel and Tourism Council (WTTC), the World Travel and Tourism Environmental Research Council (WTTERC), and British Airways Environment Division was also reviewed. Contacts were made with research institutes and professional associations specialising in tourism studies, and with individual researchers in universities throughout Europe, North America, Australia, South Africa and Zimbabwe. Material was received from a number of non-governmental organisations (NGOs) involved in tourism research, including the World Wildlife Fund (WWF), Wildlife Conservation

International, and Conservation International. Other organisations contacted included UNEP, the World Conservation Union (IUCN), the World Bank, and various national parks authorities.

The study aimed to consider literature on wildlife tourism from all over the world. Although this study touches on activities such as whale watching and coral reef diving, the focus of the paper is on wildlife living in natural areas on land. In the event, the majority of case studies identified came from Africa, which is the major destination for wildlife tourists, because of its high concentrations of accessible and visible large mammals. Equally, it was surprising how few studies contained any quantitative data on levels of impact arising from tourism. As a result, it has not been possible to undertake the level of analysis that was originally envisaged. However, the paper attempts to synthesise the available information, and to suggest an analytical framework that might allow appropriate analysis in the future.

The paper comprises five chapters. Case study material illustrating many of the general points made throughout the paper is presented in boxes.

Chapter 1 concludes by examining some of the definitions that are found throughout the paper. In particular, it attempts to clarify ecotourism as a subset of nature or wildlife tourism. The former term has emerged in recent years as a widely used buzz-word, but there is much confusion surrounding its precise meaning.

Chapter 2 traces the growth and impact of the tourist industry. The historical development of mass tourism is documented, from the First World War to the present day, and the subsequent move away from mass tourism and towards "alternative" tourism, as a result of the emergence of the global environmental movement. The links between tourism and sustainable development are examined briefly, followed by a consideration of the environmental impacts of the global tourism industry.

Chapter 3 turns more specifically to the wildlife tourism sector. The different types of wildlife use and players in the sector are outlined, including a consideration of certain forms of consumptive use as tourism, and the role of state-run protected areas, private land and communal land. The characteristics and prerequisites of successful wildlife tourism are outlined, and wildlife tourism destinations and activities are identified.

The environmental impacts of wildlife-based tourism are described in Chapter 4. These include direct and indirect impacts, and the impacts from associated infrastructure. Attention is focused on the various factors that influence the impact of wildlife tourism, including the characteristics of particular species, the destination area, the type of visitors and the level of use an area receives. The concepts of carrying capacity and limits of acceptable change are discussed before outlining different management strategies and tools that can reduce the impact of wildlife tourism.

Chapter 5 draws out a number of lessons learned from the study, identifies areas requiring further research, and provides a framework for that research.

1.3 Definitions

1.3.1 Tourism

The dictionary definition of tourism is "the activities of tourists and those who cater for them", while a tourist is "a person who makes a tour, especially a sightseeing traveller or sportsman". The World Tourism Organisation (WTO) considers tourism to be any form of travel that involves a stay of at

least one night but less than one year away from home. Therefore, the WTO definition includes business travel and visits to friends and relations, but not day-trips. However, tourism is generally considered as domestic or international travel for leisure or recreation, and including day-trips.

1.3.2 Nature or Wildlife Tourism

It is necessary to make clear the distinction between nature tourism, wildlife tourism and ecotourism (see section 1.3.3), as the terms are often used interchangeably. Nature and wildlife tourism (hereafter wildlife tourism) encompasses all forms and scales of tourism that involve the enjoyment of natural areas and wildlife. For the purposes of this study, "wildlife tourism" is defined loosely as:

tourism that includes, as a principle aim, the consumptive and non-consumptive use of wild animals in natural areas. It may be high volume mass tourism or low volume/low impact tourism, generate high economic returns or low economic returns, be sustainable or unsustainable, domestic or international, and based on day visits or longer stays.

This definition has been adopted to enable this review to encompass a broad range of different wildlife related tourism initiatives and approaches, and to compare the environmental impacts associated with them. In contrast, only those forms of wildlife tourism that make a positive contribution to nature and wildlife conservation constitute ecotourism (see section 1.3.3).

1.3.3 Ecotourism

The term "wildlife tourism" is often assumed largely to comprise tourism that involves international travel by people from rich developed countries to wildlife areas in poorer developing countries, as a means of providing much needed foreign exchange for hard pressed national economies, and earnings for poor rural people, as well as a reason for justifying the upkeep of wildlife in protected areas.

The notion of these interrelated conservation and economic benefits has led to much confusion surrounding the variety of terms currently in use that appear to have similar meanings and aims. These include "alternative tourism", "sustainable tourism", "green tourism", and "ecotourism". Some of these terms frequently appear to be used interchangeably, while others may be defined in a variety of ways. Box 1.1 provides examples of the numerous definitions of the term ecotourism found in the literature.

In reality, ecotourism has become widely adopted as a generic term to describe tourism that has, as its primary purpose, an interaction with nature, and that incorporates a desire to minimise negative impacts (Orams 1995). Implicit in the term is the assumption that local communities should benefit from tourism and will help to conserve nature in the process (Goodwin 1996).

Box 1.1: Definitions of "Ecotourism"

Numerous definitions of the term "ecotourism" are in use. Examples include:

"Visits to national parks and other natural areas with the aim of viewing and enjoying the plants and animals as well as any indigenous culture" (Boo 1990).

"An enlightening nature travel experience that contributes to the conservation of the ecosystem while respecting the integrity of host communities" (Cater and Lowman 1994).

"Responsible travel to natural areas which conserves the environment and improves the welfare of local people" (Lindberg and Hawkins 1993).

"Tourism that involves travelling to relatively undisturbed or uncontaminated natural areas with the specific object of studying, admiring and enjoying the scenery and its wild plants and animals as well as any cultural aspects (both past and present) found in these areas" (Ceballos-Lascurain 1993).

"Tourism which is based upon relatively undisturbed natural environments, is non-degrading, is subject to an adequate management regime and is a direct contributor to the continued protection and management of the protected area used" (Valentine 1991).

"Tourism that is environmentally sensitive" (Muloin 1991).

"Purposeful travel that creates an understanding of cultural and natural history, while safeguarding the integrity of the ecosystem and producing economic benefits that encourage conservation" (Ryel and Grasse 1991).

"Low impact nature tourism which contributes to the maintenance of species and habitats either directly through a contribution to conservation and/or indirectly by providing revenue to the local community sufficient for people to value, and therefore protect, their wildlife heritage area as a source of income" (Goodwin 1996).

CHAPTER TWO

THE GROWTH AND IMPACT OF THE TOURISM INDUSTRY

2.1 The Development of Tourism

The origins of tourism extend back to the time of the ancient Greeks. However, tourism did not occur on any large scale until the Industrial Revolution, when affordable travel provided by the railways, combined with the paid holidays offered by employers to their employees, stimulated the development of seaside resorts in Europe and the United States catering for the new middle class (Pearce 1981). By the outbreak of the First World War, tourism had developed from a domestic to an international phenomenon. The two wars stimulated the development of aeroplane technology, and hence of air travel. In the post war period, tourism grew into a mass industry. Modern mass tourism has its origins in the affluence of the industrialised nations of the West and the Asia Pacific region and the associated increase in disposable income and leisure time (Cochrane 1994). The development of tourism has also been closely associated with advances in transport technology (Pearce 1981), cheap oil, and the entry of multinational companies to the tourism industry (Hunter and Green 1995).

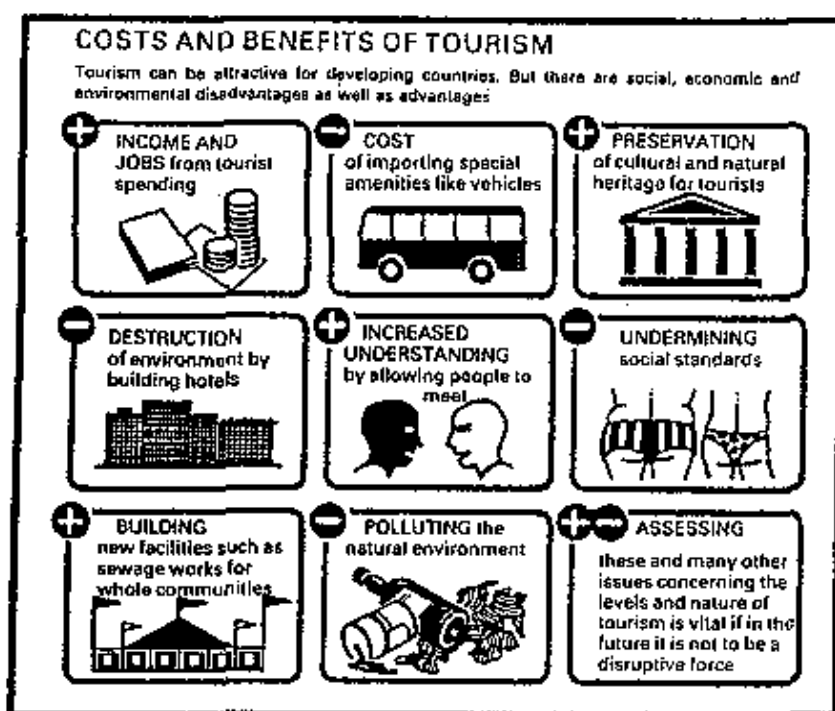
The number of international tourist arrivals has grown exponentially, from 25 million in 1950, to 183 million in 1970, to 450 million international travellers in 1991. This figure is expected to grow to 650 million by the year 2000 (Lindberg and Hawkins 1993). Statistics are not so readily available for the scale of domestic tourism. However, estimates from the late 1980s suggest that expenditure on domestic tourism accounts for approximately 90 per cent of total tourism expenditure (Hunter and Green 1995), and this sector is also predicted to rise dramatically (Ceballos-Lascurain 1996). The World Travel and Tourism Council (WTTC) claims that tourism is the world's largest industry, generating a gross output of US\$ 3.4 trillion, more than either the automotive or electronics industries, or agriculture. In 1994, tourism was estimated to generate over 10 per cent of the world's gross domestic product. It is also estimated that the tourism industry employs one in nine workers worldwide, and this figure is expected to double by the year 2005 (WTTC 1994).

Since the late 1960s, tourism has been promoted by agencies such as the World Bank, the regional development banks and the United Nations as a route to development for developing countries. In the 1960s and 1970s, tourism was enthusiastically adopted as an economic strategy by many former colonies emerging as independent states and struggling for investment capital and foreign exchange. Tourism appeared to constitute a relatively non-controversial form of development, and was considered as "a policy where there appear to be substantial rewards and few interests to placate or offend" (Wyer and Towner 1988). Therefore, tourism represented an active policy choice for many governments. By the time of the UN Conference on World Tourism, held in Manila in 1980, it was considered that "tourism is an activity essential to the life of nations because of its direct effects on the social, cultural, educational and economic sectors of national societies and their international relations" (Murphy 1985).

The ever increasing economic importance of the tourism industry has now gained the attention of most countries of the world. Tourism was accorded little political relevance as recently as 10 years ago. Now most countries, developed and developing, have some sort of tourism policy and national tourism development corporation (Ceballos-Lascurain 1996). Many countries devote considerable amounts of money to tourism promotion. In the words of the WTO: "Tourism is one of the most important economic, social, cultural and political phenomena of the twentieth century, and the State can not be indifferent to it" (cited in Ceballos-Lascurain 1996).

Despite the huge growth in the industry, numerous studies during the 1970s revealed that tourism was no panacea for development, as illustrated by some of the costs and benefits of tourism for developing countries (Figure 2.1). A particular concern has been the high "leakage" of tourism-generated foreign exchange, whereby such revenue ends up benefiting foreign-owned tour operators, hotels and airlines. The World Bank estimates that 55 per cent of tourist spending in developing countries leaks back to developed countries, while other studies indicate the figure may be as high as 90 per cent (Koch 1994). At the same time, public concern about the environment has increased. In the 1980s, this disquiet was concerned with the impacts of mass tourism on the natural environment and on the culture of local people. These concerns saw the emergence of alternative forms of tourism, the enterprises of which tended to be small-scale and "low key", with an emphasis on locally owned, traditional accommodation units (Pearce 1994). This was intended to cater for the "alternative traveller seeking intimate but non-destructive contact with foreign cultures and environments" (Pleumarom 1994). This form of tourism had two branches, paradise hideaways on islands such as Bali, and "ethnic tourism" such as trekking in the Himalayas.

Figure 2.1: Costs and Benefits of Tourism



Source: UNEP (1989).

This proved to be a very lucrative sector of the industry, and commercial considerations of marketing the latest "undiscovered" paradise quickly overshadowed any concerns for environmental or cultural degradation. Indeed, the marketing of alternative tourism may well have accelerated social degradation, because more and more previously unknown destinations were discovered and subsequently opened up to mass tourism. As with the term "ecotourism" (see Chapter 1), there is similar confusion regarding the term "alternative tourism" that is often used as a generic term encompassing a range of variations such as ecotourism and green tourism, all of which purport to offer a more benign alternative to conventional mass tourism (Weaver 1991). Indeed, alternative tourism has been described as "one of the most widely used and abused phrases of the last decade", which it is argued can mean anything to anyone (Butler 1994).

By the late 1980s, another shift in the tourism industry's marketing strategy occurred alongside the emergence of the global environmental movement. In the decade of "green consumerism", critical consumers were soon leading the demand for "environmentally sound" holidays (Krippendorf 1987). Tour operators and travel companies began to promote themselves and their products as "environmentally friendly", and a number of companies published ethical and environmental codes of conduct and guidelines for travellers as well as guidelines for self regulation (see Boxes 2.1 and 2.2). Tour companies also started to promote wildlife tourism and ecotourism holidays to all corners of the world (as illustrated in Figure 2.2), to coincide with the inclusion of the environment on the mainstream political agenda (Pholpoke 1994). At the same time the tourist hunting industry has expanded dramatically. Safari Club International (SCI), the largest trophy hunter's organisation in the world, is growing annually by 1,500 to 2,000 new members from all over the world (Jackson 1996).

Several trends can be discerned in today's tourism industry. These include:

- continued growth in both domestic and international tourism;
- a shift in destinations from developed to developing countries;
- an increased interest in "activity" holidays as opposed to traditional beach holidays;
- an increased interest in travelling to more natural settings and less disturbed areas as a result of increased interest worldwide in environmental matters and nature; and
- an increased interest in "exotic" locations and cultures as a result of television documentaries, films and "glossy" literature (Ceballos-Lascurain 1996).

These trends are illustrated by figures from the United States, where wildlife tourism is now the fastest growing sector of the tourism industry with annual growth rates of 25-30 per cent (Jackson 1996). An important component of this growth is big game hunters, who increased in numbers by 13 per cent from 1980 to 1990 (Jackson 1996). Wildlife tourism currently accounts for 10 per cent of international tourism (Pleumarom 1994) with its global value in 1988 estimated as high as US\$1 trillion (Filion *et al.* 1992). More and more countries now actively promote tourism to natural areas, usually to areas protected for wildlife (see Chapter 3).

Box 2.1: World Travel and Tourism Council Environmental Guidelines

- Travel and tourism companies should state their commitment to environmentally compatible growth.
- Targets for improvement should be established and monitored.
- Commitment to the environment should be company-wide.
- Environment improvement programmes should be systematic and comprehensive. They should aim to
 1. identify and minimise product and operational environmental problems, paying particular attention to new products;
 2. pay due regard to environmental concerns in design, planning, construction and implementation;
 3. be sensitive to conservation of environmentally protected or threatened areas, species and scenic aesthetics, achieving landscape enhancement where possible;
 4. practice energy conservation;
 5. reduce and recycle waste;
 6. practice freshwater management and control of sewage disposal;
 7. control and diminish air emissions and pollutants;
 8. monitor, control and reduce noise levels;
 9. control, reduce and eliminate environmentally unfriendly products, such as asbestos, CFCs, pesticides and toxic, corrosive, infectious, explosive or flammable materials;
 10. respect and support historic or religious objects and sites;
 11. exercise due regard for the interests of local populations, including their history, traditions and culture and future development; and
 12. consider environmental issues as a key factor in the overall development of travel and tourism destinations.

Source: WTTC (1994).

Box 2.2: British Airways "Fragile Earth" Guidelines for Travellers

Fragile Earth: Wherever You Go Be A Friend To The Environment

After a comprehensive review of its operations, British Airways Holidays stated that the company's policy is to improve its environmental performance and work as a member of the tourism industry to safeguard holiday destinations for future generations.

As part of that commitment, British Airways Holidays asks all its customers to respect the history, culture and natural beauty of the countries they visit. The following suggestions are for you to consider when travelling.

- Never buy ivory or similar products that exploit wildlife.
- Try to use local services and produce, by doing so you will get better value for money and help the local economy.
- Avoid disturbing or damaging wildlife or plants. Always pick up your litter - bottles, cans and plastic can be deadly to wild animals.
- Take special care near coral reefs. Corals are living organisms, easily damaged by touch.
- Avoid standing on them and resist the temptation to remove corals, shells or other reef species.
- Many countries are working to protect their environment. You can help support those efforts by visiting buildings, museums, parks and reserves.
- Don't stay silent if you come across environmental problems. Write to the local tourist organisation, the country's UK tourist office or an environmental organisation.
- Take care not to disturb wildlife by disturbing their natural behaviour or habitat.
- In reserves/national parks, avoid damaging vegetation, keep to roads and tracks and do not risk starting fires with discarded cigarettes.

Source: British Airways Holidays "Worldwide" brochure (undated).

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9

2.2 Tourism and Sustainable Development

The growth in alternative forms of tourism has occurred simultaneously with increased recognition of the need to implement the concept of sustainable development. As with "ecotourism" (see Chapter 1), "sustainable development" is another environmental catch phrase with no single definition. The most widely used definition is that of the Brundtland Commission in *Our Common Future*, throughout which runs the theme of sustainable development defined as:

"development which meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987).

On the face of it, no other economic activity would appear to lend itself to sustainable development better than tourism (Sadler 1987). Alternative forms of tourism that incorporate environmental and cultural conservation objectives with an emphasis on economic benefits to local communities would appear to be a panacea for sustainable development. Because damage to the environment threatens the resource base on which alternative forms of tourism depend, it would be logical to expect all involved in tourism to ensure the protection of these resources. All forms of tourism consume resources such as land and energy. However, when practised against the standards of its definition, the small scale and dispersed nature of ecotourism, combined with connotations of sound environmental management, means that it has the potential to consume far less basic resources than other forms of tourism or other developments.

Alternative forms of tourism, however, have the potential to be more damaging than mass tourism since they often occur in fragile or unique environments. Small scale operations in environmentally sensitive locations may eventually turn into much larger and more destructive operations (Hunter and Green 1995). Alternative forms of tourism may simply represent the early stages of the conventional tourist destination life cycle (Wall 1994). The life cycle concept (Figure 2.3) essentially revolves around the premise that, unless intervention occurs, tourist destination areas and resources inevitably will become over-used and, consequently, will decline. The six stages of the cycle (cited in Cochrane 1995) are as follows:

- Exploration (few tourists, poor access and facilities, environment unchanged);
- Involvement (local initiatives, some promotion, increasing numbers);
- Development (many tourists, locals lose control, deterioration of environment);
- Consolidation (tourist numbers exceed local residents, all major chains represented);
- Stagnation (numbers peak, destination falls out of fashion, environmental and social problems); and,
- Decline or Rejuvenation (or intermediaries).

This cycle has a number of obvious implications for sustainability, based on the consideration of factors such as carrying capacity, local participation, ownership, social and environmental impacts.

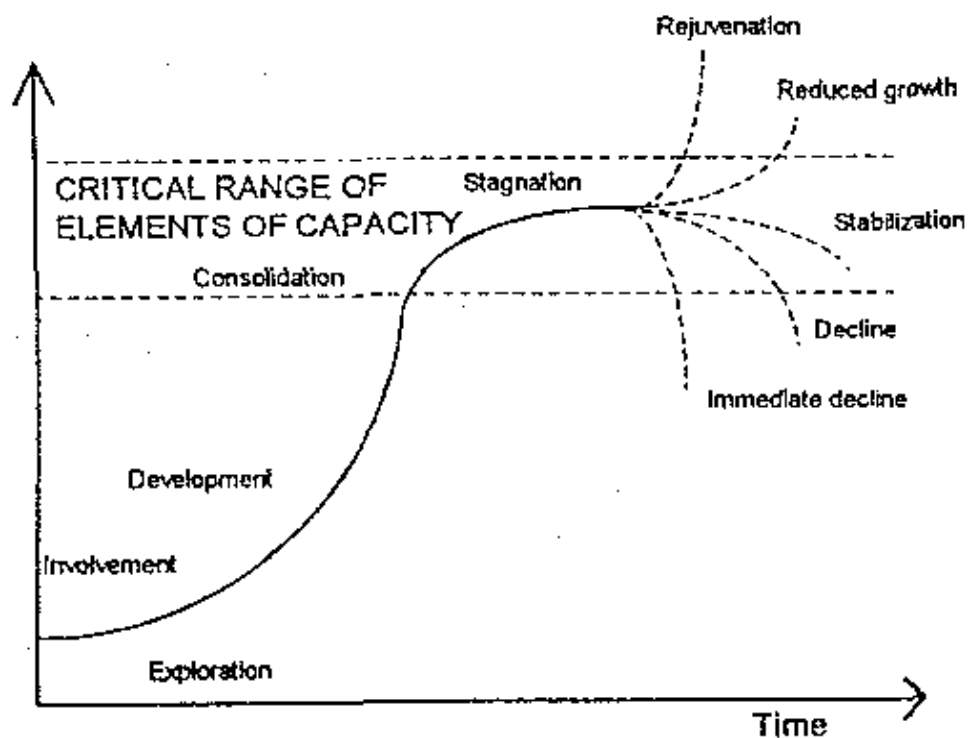
Mass tourists, on the other hand, may have less impact because they tend to limit themselves to well known, easily accessible areas and insulate themselves from the local people (Healy 1992). In some instances, the zoning of mass tourism (or enclave tourism) is adopted as a deliberate policy by a host country. For example, tourists in the Maldives are confined to self-contained, purpose built resorts on isolated, often formerly uninhabited islands, in order to avoid a culture clash between bikini-clad tourists and the conservative, Islamic islanders (Healy 1992). Enclave tourism may similarly be used to limit environmental impacts, sometimes by default rather than design. For example, despite criticisms for their totally artificial character, it has been estimated that the Walt Disney theme parks

provide the kind of tourism that millions of people want at a fraction of the environmental and social costs of the many charter flights and resort hotels around the world! (von Droste *et al.* 1992).

A recent article in the UK Youth Hostel Association's magazine, *Triangle*, takes up this theme:

"Spending your holiday in one of the latest artificial all-weather tropical pleasure domes or in intensely developed but properly managed holiday resorts like Benidorm and Torremolinos can be more environmentally friendly than indulging in trips to remote or fragile areas where tourism is more likely to be environmentally and culturally damaging and puts little or nothing back into managing and protecting the environment" (YHA 1996).

Figure 2.3: Tourist-Area Cycle of Evolution



Source: Butler (1980).

Quoted in the same article, the popular conservationist David Bellamy comments that

"Ecotourism is already a dirty word. Hill walking, jungle-trekking and all the rest are just as potentially harmful as conventional resort holidays, if not more so. Most of the tourism industry is simply sponging off clean water, fresh air, the natural and cultural environment and is putting nothing back in. But there are praiseworthy exceptions which not only do not damage the environment, but actually help to restore it. This is real ecotourism. The best example in the world is Sun City, in South Africa, which has created a fantastic purpose-built resort complex, 4500 local jobs, and has put the wildlife back onto a degraded piece of useless veldt." (YHA 1966).¹

In addition to the potential damage caused locally to tourist destinations, the air transport of tourists to remote areas of the globe seriously undermines the concept of sustainability of the industry as a whole. For example, air travel contributes 2-3 per cent of global emissions of fossil fuel derived carbon dioxide, the principal greenhouse gas, as well as nitrogen oxides, which contribute to low-level ozone formation (Somerville 1994). Paradoxically, nitrogen oxides released at high altitudes also contribute to the thinning of the protective ozone layer over the earth (Elkington and Hailes 1992).

2.3 The Environmental Impacts of Tourism

The impacts of tourism can be grouped into three main categories:

- environmental;
- cultural; and
- economic.

Impacts can result from the activities of tourists and from the construction and operation of tourist facilities and services. Impacts arising from tourism are difficult to assess, partly because of their diversity in range and in type. Impacts may be short or long term, direct or indirect, local, national or global, positive or negative (Hunter and Green 1995). The major difficulties associated with the assessment of tourism impacts (Briassoulis 1991) include:

- tourism involves a number of linked activities, making it difficult to distinguish impacts arising from individual activities;
- activities undertaken by tourists may also be pursued by the host population, making it difficult to separate the impacts arising from tourism alone;
- environmental change occurs naturally, making tourism-induced change more difficult to quantify;
- a lack of baseline data with which to compare post-development conditions;
- tourism often has indirect and cumulative impacts which are more difficult to identify and assess;
- some impacts only become apparent in the long term; and
- environmental components are inter-linked, so a tourism activity which impacts on one aspect of the environment may produce an indirect impact on another.

¹ Christo Fabricius (pers.com) comments that the environmental benefits of an increase in wildlife and jobs at Sun City needs to be weighed against the social and environmental costs of: (a) the relocation of local pastoralists to make way for wildlife, (b) an increase in gambling activities amongst local people with low household incomes, (c) increased water consumption in an arid area, (d) landscape transformation, (e) an increase in tourism-related waste, and (f) a rapid increase in population density peripheral to the wildlife area. This requires further study.

The nature of any disturbance caused by tourists will depend upon its predictability, frequency and magnitude. The impact is also related to the type of tourist as much as to the type of activity or level of tourist development. Tourists are not homogeneous, and there have been a number of studies of tourist typologies which illustrate a sequential change in the type of visitors to a particular site, beginning with a stage of "explorers", and ending with "mass tourists". A classification of tourists based on their holiday objectives and requirements for facilities is shown in Table 2.1.

Table 2.1: Classification of Tourist Types

Category	Typical Characteristics
Explorers	Individuals requiring no special facilities. Low budget. Includes bird-watchers, trekkers and climbers.
Backpackers	Limited budget. Use local facilities. Often excluded from visiting remote areas because of expense.
Special Interest Tourists	Dedicated to a particular hobby and prepared to pay to indulge it. Require specialist services such as safari guides. Travel in small groups.
General Interest Tourists	Prefer group holidays, wealthy, require good facilities.
Mass Tourists	Prefer large groups, need good facilities, high priority is comfort.

Source: Adapted from Cochrane (1994).

Assessment of the environmental impacts of tourism is particularly important since the industry is, to a large extent, dependent on the natural environment. Moreover, many tourists tend to be attracted to particularly environmentally fragile areas such as coastal zones, mountains and small islands. Therefore, damaging the environment is synonymous with 'killing the goose that lays the golden egg'. Four major sources of environmental stress are generated by tourism (see Pearce 1981):

- permanent restructuring of the environment from construction activities;
- generation of waste;
- effects associated with various recreational activities; and
- changes in population dynamics, especially seasonal increase in population and population densities.

Tourism developments may not only cause habitat disruption through requirements for buildings, golf courses and other facilities, and the activities and numbers of the tourists themselves, but may also bring about visual impacts. For example, the development of high-rise hotels, or low-rise buildings in previously natural areas, especially on dune systems, cliff tops, or in mountainous zones. Visual impacts are also felt through the development of transport infrastructure, waste infrastructure and urban infrastructure, or simply in terms of the number of people in previously isolated areas (ODA 1996), or the amount of litter they generate. The construction of supporting infrastructure such as roads, water and electricity supply, sewage and waste disposal systems will obviously have an impact on the environment as will the demand for various inputs (e.g. water and energy) in the operation of tourism services.

Unlike most other developments, tourism also increases the demands on local infrastructure and services. These may include transportation, water and energy supplies, waste collection and treatment and health care facilities. Increased demand often occurs with significant seasonal peaks, thus

resulting in serious implications for local residents should demand exceed capacity (European Commission 1993). Tourism can also generate large quantities of solid waste. This has significant implications for all countries and especially those which have only limited areas suitable for landfill or limited waste disposal infrastructure. Use of water for golf courses, showers, swimming pools and decorative fountains means that tourists can account for four to eight times more water per day than residents (ODA 1996).

Pollution is another serious problem of tourism development. It is often difficult to distinguish pollution resulting from tourism from other sources. However, there are many examples where tourism makes a significant contribution to the total pollution load of a given area. Sewage pollution particularly is recognised as a major negative impact of mass tourism (Hunter and Green 1995). Many tourist facilities, and associated industries, discharge waste water directly into the sea or lakes with little or no treatment. Cruise or pleasure craft can add to this problem through oil spills, ballast water and sewerage (ODA 1996). Whereas the impacts of water pollution are usually restricted to a well-defined area, air pollution can have much further reaching (if not global) effects (see section 2.2). Table 2.2 summarises the major environmental effects associated with tourism.

Tourism may also have a cultural impact. This can include physical damage to cultural heritage as well as impacts on local communities and cultures. The extent to which tourism makes an impact on a local community depends upon (Cochrane 1994):

- the size and scale of the development and the degree of disruption caused, both physical and social. The degree of involvement of local people is important and the relationship of tourism to the local community, i.e. whether the initiative is being imposed upon the community or developed from within;
- the disparity in terms of culture and wealth of the host community and the visitors; and
- the relative importance of tourism to the local economy.

Not all of the impacts of tourism are necessarily negative. If development and change are bound to occur in a particular site from some activity or other, tourism may be a far less damaging alternative than many other more polluting industries. The World Travel and Tourism Environmental Research Centre has listed a number of key potential benefits of tourism (Box 2.3). The ODA Manual of Environment Appraisal (1996) provides a checklist to help develop management strategies to minimise negative impacts and maximise positive benefits (Box 2.4). Therefore, alternative or other forms of tourism are not necessarily a panacea for sustainable development, unless well planned and well regulated.

Box 2.3: Key Potential Benefits of Tourism

- Protection and active conservation of natural and built heritage resources, justified by their own intrinsic value for posterity and the revenue which visitors contribute.
- Creation of economic value and protection for resources which otherwise have no perceived value to residents, or represent a cost rather than a benefit.
- Opportunity to communicate and interpret the values of natural and built heritage and of cultural inheritance of residents of visited areas.
- Enhancement of the natural and built environment to meet rising quality standards necessary to sustain modern travel and tourism.
- Reconstruction for visitor usage of urban environments and environments degraded by the industrial practices of former extractive and manufacturing industries.
- Establishment of attractive environments for tourism destinations, for residents as much as visitors, which may support other compatible new economic activity, from agriculture and fishing to service and manufacturing industries.
- Effective management of visitors within an environment so that it can support long-term economic development and repeat visits.
- Research and development of good environmental practices and management systems to influence the operation of travel and tourism businesses as well as visitor behaviour at destinations.
- Opportunities, through the direct customer contacts that all travel and tourism businesses have, for operators to communicate and interpret the values of natural and built heritage and culture to visitors, thus helping to create a new generation of responsible consumers

Source: WTIERC (undated).

Box 2.4: Checklist for Tourism Development

- Is there a minimum planning framework in place which will ensure that tourism development does not damage the quality of the local environment?
- Is there an overall strategy for economic development and a specific role for tourism in this strategy?
- Is there a sufficient infrastructural framework to support the proposed tourism development?
- Can the food and product requirements of the travel and tourism industry be met by current provision within the region or country or will it result in increased imports (and thus leakages of foreign exchange earnings)?
- Is there provision for the stimulation of other sectors (such as agriculture and crafts) to ensure maximum benefit from the development of tourism?
- Is there, or will there be, training provision for members of the local community to guarantee opportunities to assume managerial positions within tourism companies?
- Will the companies participating in the programme be selected because of their environmental profile?
- Will specific management plans be prepared for areas of cultural or natural interest?
- Have the local community been involved in the development of the programme?
- Is there provision within the programme to communicate environmental issues to tourists?

Source: ODA (1996).

Table 2.2: The Environmental Effects of Tourism.

Environmental Component	Tourism Activities	Environmental Effects
Natural Elements: Water	Disposal of litter and sewage into the sea, lakes and rivers.	Contamination and health hazard to local people and tourists; changes to and destruction of aquatic plant and animal life; loss of aesthetic value.
	Release of oil and fuel from recreational vehicles, cruise ships and other boats.	Increasing toxicity in water bodies detrimental to aquatic plant and animal life; contaminated seafood; reduction of water-based activities such as bathing and fishing.
	Increased demand on local water supplies.	Water shortages during peak tourist seasons, with serious implications for local residents should demand exceed capacity.
Atmosphere	Increased travel to tourist destinations by car, ship, plane, etc.	Air and noise pollution, particularly in peak seasons may result in a loss in recreational value; adverse impact on plant and animal life; increased use in non-renewable fossil fuels; greenhouse gas formation and ozone depletion associated with air travel.
	Increase in recreational driving in destination areas.	
Vegetation	Forest clearance for resort construction; increased use of firewood.	Structural alteration of plant communities, leaving fewer trees to mature and provide shelter for the site.
	Careless use of fire in forests and parks.	Conflagrations in forested areas; decline in diversity of plant species.
	Pedestrian and vehicular traffic at campsites, trails, etc.	Constant trampling may cause disappearance of fragile species; damage to tree roots; damage to plant habitats, increased soil erosion.
	Collection of flowers, plants and fungi.	Changes in species composition; disappearance of rare species.
	Introduction of alien species.	Changes in species composition and inter-species relationships.
Wildlife	Indiscriminate hunting and fishing.	Changes in species composition; disappearance of rare species.
	Poaching for souvenir industry.	Reduction of wildlife numbers.
	Wildlife harassment from viewing and photography.	Disruption of feeding and breeding, disruption of predator-prey relationships.
	Development of highways and trails through natural areas.	Relocation of feeding and breeding areas or even destruction of wildlife habitats and disturbance of wildlife migrations.
Ecosystems: Oceanic Islands and Coastlines	Construction of hotels, camping sites, golf courses, access roads, etc.	Elimination of plant and wildlife habitats; interference with breeding habits of wildlife; erosion of beaches and dunes; obliteration of geological features by excavation or water pollution; loss of natural beauty; unsightly urban-like development.

Mountains	Construction of tourist accommodation, mechanical lifts, power lines, sewage systems, etc.	Disturbance of plant and animal life; disruption of soil stability; alteration of drainage system and water run off may result in increased numbers and scale of landslides, rockfall and floods; visual impact of scars on the landscape.
	Trekking, mountaineering, skiing.	Reduction in number and diversity of plants and animals; soil erosion, littering.
Human Environment:		
Human settlements	Expansion of hotel development and associated tourist infrastructure such as restaurants, bars, souvenir shops, etc.	Displacement of local people; loss of amenity to remaining residents due to traffic congestion and overloaded infrastructure; increased pollution and noise.
Historic and religious monuments	Excessive use for tourist purposes.	Overcrowding may result in trampling, littering; alteration of traditional use and function; desecration; exclusion of traditional users.

Source: Adapted from O'Grady (1990).

CHAPTER THREE

WILDLIFE TOURISM

3.1 Characteristics of Wildlife Tourism

Wildlife tourism encompasses a range of activities, including bird watching, wildlife viewing, photographic and walking safaris, reef diving, whale watching, trophy hunting and sport fishing. Wildlife tourism may be achieved through many different forms of transport, including on foot, by vehicle, boat or balloon. Wildlife tourism may be purposeful or may also include tourists who visit wildlife areas as an incidental part of a broader trip. For example, many tourists book a combination beach and safari holiday in Kenya. Business trips may also involve visits to wildlife areas that are casual diversions rather than the prime motivation for visiting a country.

Wildlife tourism is an important component of the international and domestic tourism industry. Overall, depending on the region, wildlife tourism accounts for 20 to 40 per cent of international tourism (Filion *et al.* 1992; Giongo *et al.* 1993, CEP 1994). The scale of wildlife tourism is even larger if domestic wildlife tourism is taken into consideration. However, statistics are often not available to determine what proportion of wildlife tourism is domestic in origin, but it is likely to be very high in some countries. For example, nationals make up around 15 to 25 per cent of wildlife tourists in Canada (Filion *et al.* 1992), and some 90 per cent of visitors to the national parks in Thailand, India and South Africa (Ceballos-Lascurain 1996).

As with tourism generally, wildlife tourism is likely to increase in importance and scale (Giongo *et al.* 1993; see also section 2.1). Furthermore, it may also attract an increasing market share, as suggested by a number of surveys indicating an increasing interest in wildlife among tourists. A 1994 Gallup Survey found that the enjoyment of wildlife was a priority for 90 per cent of UK holidaymakers, while a 1992 study for the Canadian Wildlife Service of a variety of destinations found that wildlife was a prime attraction for 32 per cent of tourists to Australia, 80 per cent to Kenya and Zimbabwe, 30 to 64 per cent to North America, 9 to 60 per cent to Latin America (Mexico, Belize, Dominica, Costa Rica and Ecuador) and approximately 50 per cent to Europe (Risk and Policy Analysts Ltd 1996).

The last 20 years have seen a shift in favoured tourism destinations towards developing countries, especially those rich in biodiversity. Notable areas are Central America, the Amazon, Southern and Eastern Africa, South and South East Asia (BMZ 1995). Hence, the rate at which wildlife tourism is growing in protected areas in developing countries exceeds that in developed countries (Giongo *et al.* 1993). Key habitat and species have an undeniable influence on the popularity of wildlife tourism destinations (Risk and Policy Analysts Ltd 1996). The major destination for wildlife tourists are African savannahs since this is where the highest concentrations of easily accessible, readily visible large mammals are found. In contrast, wildlife tourism has been slower to develop in rainforests. In Latin America, for example, rainforests provide difficult access to wilderness areas, may occur in politically unstable areas and have been weakly marketed. Furthermore, the flagship mammalian species of interest to most tourists are secretive in their habits and less well known than their African counterparts (Box 3.1). Equally, many more unusual tourist destinations with good visibility, such as the Antarctic, are becoming increasingly popular (see Box 4.12).

The successful marketing of wildlife tourism appears to be related to the predictable occurrence of certain target species within a relatively restricted area. Wildlife tourists expect a reasonable guarantee of seeing a particular key species or species group before they visit a location in any

Box 3.1: Developing Ecotourism Along Trails in Manu National Park, Peru

Tourism has been slow to develop in South American rainforests, because of difficult access, political instability and weak marketing. Furthermore the flagship mammalian species are secretive in their habits and less well known than their African counterparts.

Manu was established as a National Park in 1973, designated a Biosphere Reserve in 1977, and inscribed as a World Heritage Site in 1987. A core area of 15,328 sq. km is preserved in its natural state, an experimental zone of 2,570 sq. km serves as a buffer zone set aside for research and ecotourism, and a cultural zone of 914 sq. km provides an area of permanent human settlement where sustainable uses of land and forest are promoted. The Madre de Dios region contains some of the most diverse and spectacular cloud and lowland tropical rain forest in the world boasting an astounding diversity of species comprising some 200 mammals and 1,000 birds. Some of the only remaining large and observable populations of endangered species are found in this area including the giant otter, jaguar, woolly monkey, tapir, several species of macaw, toucan and curassow. The 12 species of primates are one of the main tourist attractions.

Nature tourism is the fourth largest industry in Madre de Dios, comparable to, or exceeding the market in rubber and Brazil nuts. Little organised tourism existed in the region prior to 1975, largely due to the lack of transportation. Even now, little infrastructure exists to tap the potential nature tourism market. In Manu, limited tourism has developed since 1980. Initially this took the form of individuals or small groups in privately chartered canoes followed by organised tours from 1984 based in small camps in forest clearings or along oxbow lakes. In 1986, the first permanent tourist facility was built. However, Manu Lodge accommodates only around 30 visitors who stay an average of seven days. The level of visitation up to 1990 was around 500 visitors per year, usually during the dry season (May to September). Access to the Park is still one of the main limitations to tourism in Manu. The reserved zone lies one day's journey by car from Cuzco along a dirt road followed by 6 to 12 hours by river.

A trail system around Manu Lodge has been designed to provide maximum viewing opportunities to tourists. All trails start and end at the lodge and are of varying lengths. The trails are walked by tourists, led by a guide at dawn, midday and dusk. Canoe trips are also taken on the oxbow lakes. The number of tourists in each group is deliberately kept small. However, studies indicate that groups of six tourists cause no more disturbance to wildlife than groups of three. Nevertheless, there are some reports of independent guides digging up turtle nests, chasing otters, swimming jaguars and tapirs, and disturbing shore-nesting birds to provide photo opportunities.

The main effect of tourism development in Manu has been to increase boat traffic and hence the level of disturbance on the Manu River, the only access route for tourists. The river provides access to 24 oxbow lakes (*cochas*), the preferred habitat of the giant otter, of which three are visited by most tourists. Groups of giant otters have a preferred lake but swim to others in search of fish. Tourist groups have been recorded pursuing otters around the lakes for photographs, disturbing their feeding. This disturbance is exacerbated because the peak tourist season coincides with the period when feeding otters are concentrated on a few lakes.

Otters can also be disturbed when bringing large fish ashore to eat by trails that come too close to the lake shores. The trail system appears to cause little disturbance to the behaviour patterns of primates and cats. In most instances, the loss of land caused by trail clearing is negligible. It was found that animals begin to use the trails very soon after they are cut. Regrowth of vegetation along trails is spectacularly quick and occurs during the rainy season when tourist pressure is low.

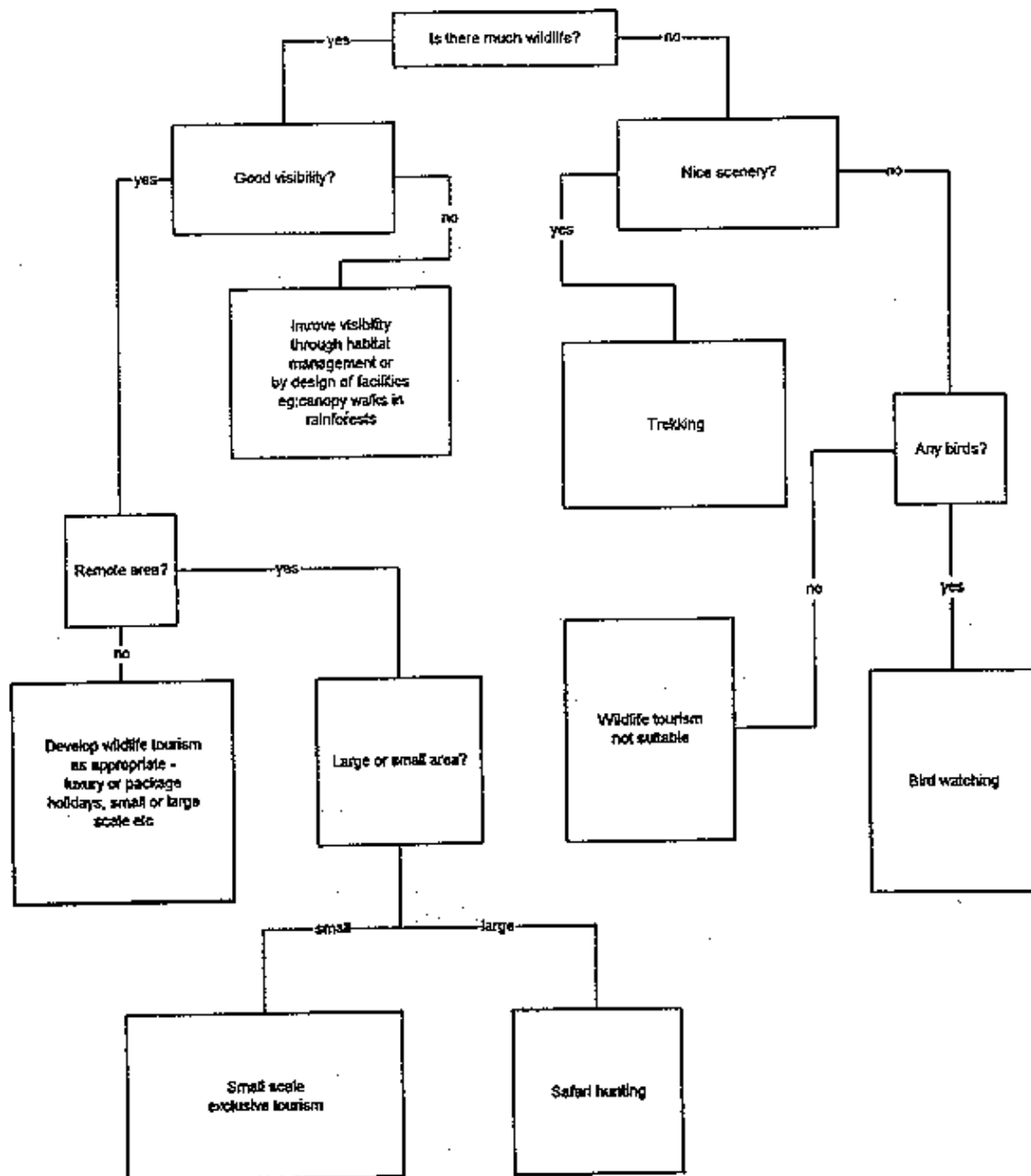
Sources: Dunstone and O'Sullivan (1994), Groom *et al.* (1991), and Redford and Robinson (1991).

substantial numbers (WTO and UNEP 1992). The following summarises the attitude of many tourists:

"The vital word in wildlife tourism is 'big'. People who travel the world to see animals want them to be large - and preferably deadly - or they want to see huge numbers. There is another vital ingredient. You must be able to get close up. Distant wildlife does not sell, the experts agree." (Newlands 1997).

Bird watching is the largest single category of non-consumptive wildlife tourism world-wide, largely because bird communities always remain in the highly modified habitats found throughout developed countries and are generally accessible (WTO and UNEP 1992). In North America, bird watching is one of the fastest growing wildlife-based activities involving maybe as many as 40 million people annually (Ceballos-Lascurain 1996). Overall, however, whale watching is the fastest growing form of tourism in the world, attracting more than 6 million visitors every year (Newlands 1997). Figure 3.1 illustrates various factors involved in deciding what form of wildlife tourism should be promoted in a particular area.

Figure 3.1: Decision-Making Process for Development of Wildlife Tourism Initiatives



Source: Adapted from Jennings (1993).

"Hotspots" for all kinds of wildlife tourists are often focused on locations that play a crucial part in the life history of particular species, for example migration routes or breeding grounds. The most successful wildlife tourism enterprises are those that are based on key species or combinations of species and species groups, for example the mountain gorillas in Rwanda, sea turtles and birds in Costa Rica, and howler monkeys and coral reefs in Belize. Although Amboseli National Park in Kenya is home to 56 large mammal species and 400 bird species, lion and cheetah account for over 50 per cent of tourist viewing time (Table 3.1). Vehicles tended to be concentrated in those areas where the probability of finding key species was highest, with 80 per cent of tourists restricting their viewing to some 15 sq km along woodland and swamp edges, causing severe congestion (Henry 1980). Similarly, a recent questionnaire survey showed that the presence of four key species was important to tourists visiting Zambia's South Luangwa National Park. Some 94 per cent of respondents listed leopards as a major influence on their visiting the park, closely followed by lions (92 per cent), elephants (86 per cent) and giraffes (78 per cent) (Butler 1996). The same survey also analysed the tourism activities reported as most important by respondents as part of their stay in the park (Figure 3.2). The most important were: seeing animals close up from vehicles (mean rating of 4.34 on an arbitrary scale of 1 to 5 with 1 being *definitely not important* and 5 being *very important* to the tourist) and seeing rare animals (4.33), followed by being in a wild landscape (4.3) and night game drives (4.28).

Table 3.1: Target Species for Wildlife Viewing in Amboseli National Park, Kenya

Species	Groups in Park	Viewing Time (%)
Lion	8	27-30
Cheetah	3	12-15
Elephant	27	13
Rhino	2	9
Giraffe	56	6
Buffalo	14	5
Zebra	475	5
Wildebeest	300	3
Impala	67	2.5
Jackal	-	2
Gazelle	467	2
Primates	-	1
Warthog	-	<1
Waterbuck	-	<1
Birds	-	4

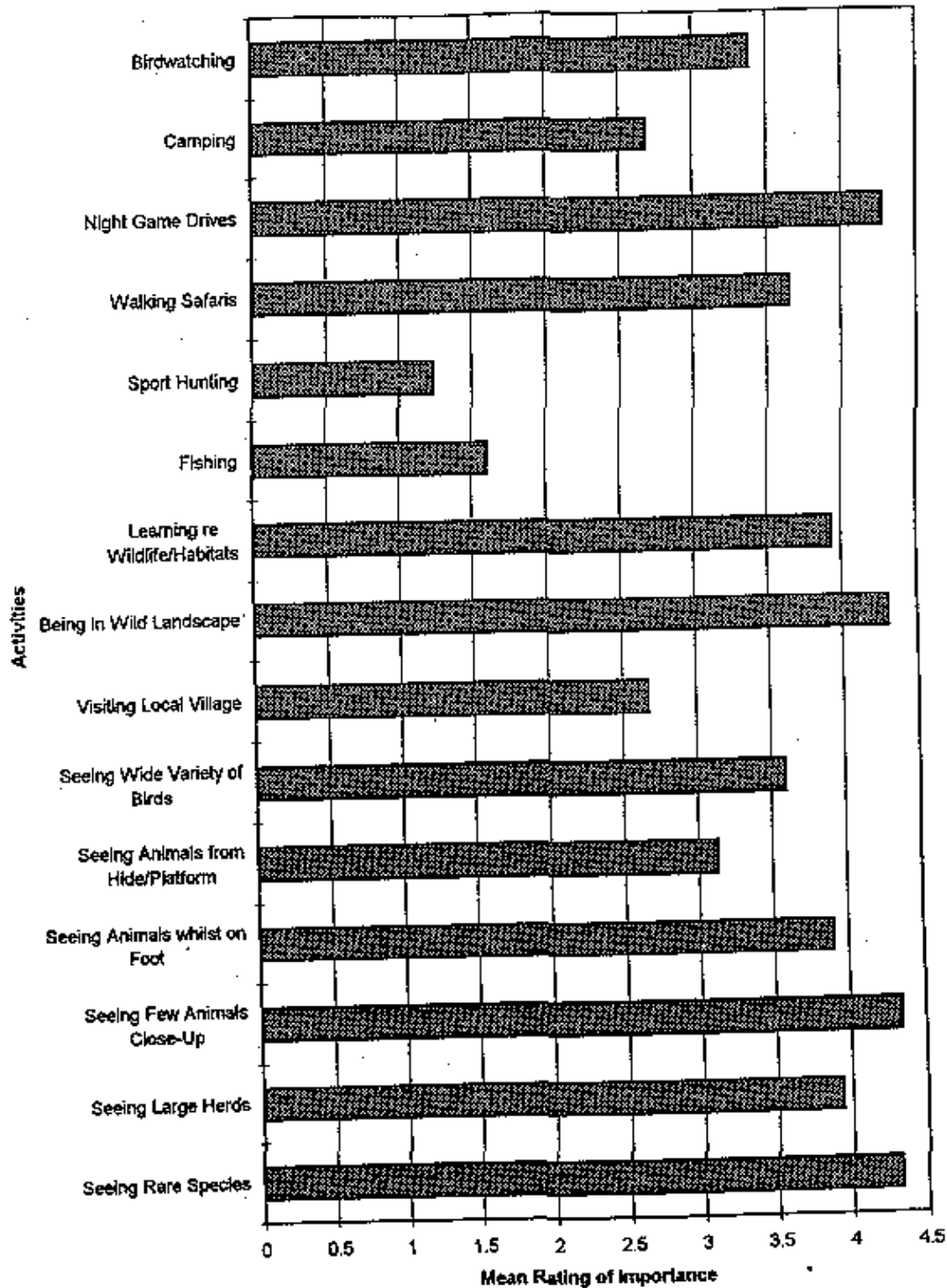
Source: Henry (1980).

A summary of prerequisites for wildlife tourism suggests four essential factors (Barnes *et al.* 1992):

- the management of wildlife tourism needs to be sensitive to the scale and type of tourism, both of which can impact on wildlife populations and local communities;
- local communities need to benefit from tourism-generated income so that they have an incentive to protect lands and wildlife;
- tourism in protected areas should further, rather than counteract, the goals of protected areas management; and
- wildlife tourism needs to be accessible to visitors from a wide range of regions and economic backgrounds, and not restricted to rich foreigners.

Figure 3.2

Importance of Tourism Activities as Part of Visit to the South Luangwa National Park, Zambia



Source: Butler (1996).

In recognising these or similar prerequisites, a number of western donors have proposed guidelines for the development of wildlife tourism. For example, the German Ministry for Economic Cooperation and Development advocates the development of "Cooperative Protected Area Management (CPAM)". The objective of CPAM is:

"to ensure a high degree of networking between the various players involved in conservation or ecotourism or those parties affected thereby, and to facilitate their participation in the management of the protected area in the form of committees or round tables" (BMZ 1995).

The main responsibility of the official authorities would be the establishment of relevant statutory and planning frameworks; local communities would participate as entrepreneurs, or at least have their interests fully represented; the private sector would input professional know-how; and NGOs could provide conservation expertise and act as mediators.

A participant at a recent UK Overseas Development Administration consultation on African wildlife policy noted that a prime requirement of wildlife tourism is

"institutional development to blend private and public sector agendas, at the national and international level, so as to encourage truly sympathetic tourism in support of sustainable rural development and the alleviation of poverty" (Child 1996).

Despite these statements, wildlife tourism has developed in rather a different manner, and the rest of this chapter will examine various forms of wildlife tourism on different categories of land.

3.2 Wildlife Tourism In Protected Areas

Wildlife tourism is often thought of in the context of legally protected areas set aside both for conservation purposes and for economic development (Giorgio *et al.* 1993). Indeed, the siting of many protected area networks in both developed and developing countries has seldom been determined by nature conservation priorities alone (see Leader-Williams *et al.* 1990). The world's first national park was established at Yellowstone in USA in 1872, as a "public park or pleasuring ground for the benefit and enjoyment of the people". Soon afterwards four Canadian national parks were established around railways in scenic mountainous areas on the initiative of railroad companies wishing to increase their tourist traffic. These and several other Canadian national parks established subsequently have not been removed from economic development, but instead have been the focus for that development (Bella 1987).

The trend of developing tourism in more natural settings continues, and protected areas are obviously among the prime attractions for tourists (Giorgio *et al.* 1993). The United States National Parks System continues as the largest tourist attraction anywhere in the world (WTO and UNEP 1992) while Australia's Great Barrier Reef is one of the best known national parks with around 0.5 million visitors a year (Jeuner and Smith 1992).

National parks are the most common and well-known type of protected area but there are other categories designated by IUCN that cover a range of management objectives and levels of use (Table 3.2). Thus, non-consumptive tourist activities may be offered in protected areas with high levels of protection, while consumptive tourist activities may be offered in protected areas in lower categories of protection (see also section 3.5).

Protected areas are perhaps the prime sites for wildlife tourism since they offer some guarantee of maintaining their attractions in the long term through a strong legislative regime. At the same time, international wildlife tourism can contribute enormously to the management of protected areas, particularly in developing countries. Benefits include foreign exchange revenue, employment

Table 3.2: IUCN Protected Area Management Categories and International Designations for Outstanding Protected Areas

Category	Type	Description
Ia	Strict Nature Reserve	Area of land or sea possessing some outstanding or representative ecosystems, species, geological or physiological features, available primarily for scientific research and/or environmental monitoring.
Ib	Wilderness Area	Large area of unmodified or slightly modified land or sea, retaining its natural character and influence, without permanent or significant habitation, managed to preserve its natural condition.
II	National Park	Natural area of land or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of the designation and (c) provide a foundation for spiritual, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.
III	Natural Monument	Area containing one or more natural/cultural features of outstanding value because of its inherent rarity, representative or aesthetic qualities or cultural significance.
IV	Habitat/Species Management Area	Area of land or sea subject to active management intervention so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.
V	Protected Landscape/Seascape	Area of land/coast/sea where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value.
VI	Managed Resource Protected Area	Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.
	World Heritage Site	Area of outstanding universal value, designated with the principal aim of fostering international co-operation in safeguarding these important areas through the World Heritage Convention.
	Biosphere Reserve	Area designated to meet a range of objectives, including research monitoring and training, as well as conservation roles through UNESCO's Man and the Biosphere Programme. The human component of the programme is vital, which aims to establish a network of areas that is representative of the world's ecosystems.

Source: IUCN (1994).

opportunities, improving awareness of conservation objectives and stimulation of economic activity (Box 3.2). In Rwanda, tourism receipts were US\$10 million in 1990, of which 60 per cent was directly attributable to gorilla tourism in the Parc National des Volcans (Weber 1993). Some of this revenue is used to employ 70 game guards from the surrounding area. In South Africa's Kruger National Park, the income generated from tourists exceeds the cost of maintaining the park (Box 3.3). Galapagos Islands National Park is an important source of foreign exchange for Ecuador (Cochrane 1994).

Wildlife tourism can clearly make a positive contribution to the management of protected areas. However, the goals of wildlife conservation may at times be diametrically opposed to those of social sustainability. Hence, wildlife conservation objectives, sometime stated in utilitarian terms of promoting tourism, may also have social implications. The designation of protected areas in developing countries may contribute greatly to conserving wildlife and attracting tourists, but at the cost of excluding local communities from traditional practices such as nomadic pastoralism, cultivation and gathering wood, grass, medicinal plants and minor forest products, and so on

(Leader-Williams *et al.* 1990). For example, Maasai pastoralists have been displaced from traditional grazing lands in Kenya and Tanzania through the creation of national parks (Parkipuny 1996). Indeed, Nairobi and Amboseli parks in Kenya were excised from land that had provided dry season grazing and permanent water sources for the Maasai (Berger 1996). Their dissatisfaction has been such that they have even killed important components of the wildlife resource upon which the tourism industry depends in Amboseli in protest (Cater 1993).

Box 3.2: Potential Benefits of Tourism in Protected Areas

Tourism to protected areas, when well managed, can have the following benefits:

- it generates local employment, both directly in the tourism sector and in the various support and resource management sectors;
- it stimulates profitable domestic industries, such as hotels, restaurants, transport systems, souvenirs and handicrafts and guide services;
- it generates foreign exchange;
- it diversifies the local economy, particularly in rural areas where agricultural employment may be sporadic or insufficient;
- it stimulates the rural economy by creating demand for agricultural produce and injecting capital;
- it stimulates improvements to local transportation and communications infrastructures, which brings benefits to local people;
- it encourages local government to provide extra resources to promote development in surrounding areas, particularly for those protected areas where tourism establishes the area as a showpiece for the country;
- it encourages productive use of lands which are marginal for agriculture, enabling large tracts of land to remain covered in natural vegetation;
- it improves inter-cultural understanding and global communication;
- if adequately conducted, it can provide a self-financing mechanism for the park authorities and consequently serve as a tool for conservation of the natural heritage;
- it creates recreational facilities which can be used by local communities as well as domestic and foreign visitors; and
- it promotes conservation by convincing government officials and the general public of the importance of natural areas.

Source: WTO and UNEP (1992).

Patterns of wildlife tourism may also have negative impacts upon particular areas. For example, Kenya's reputation as a wildlife tourism destination owes much to its system of national parks and reserves that cover 8 per cent of the country's land area. Nevertheless, this wildlife tourism industry is heavily dependent on just a few parks (Table 3.3), which then produce revenue for the wildlife authority upon which the less visited areas depend. Such unevenly distributed patterns of visitation can have serious implications for the carrying capacities of the most heavily visited sites. The potential problems caused by tourism are increasingly recognised in protected area management plans for key destinations such as the Galapagos Islands and Mount Kilimanjaro (Boxes 3.4 and 3.5), as well as by national wildlife and tourism policies. For example, the policies for both national parks and other protected areas in Tanzania recognise the need to determine acceptable volumes of tourists, and to diversify the tourist circuits to incorporate the less heavily visited parts of southern Tanzania (TANAPA 1994; Department of Wildlife 1994).

One of the major challenges for wildlife tourism is how to ensure that protected areas are financially self-sufficient without detracting from their primary function of preserving biodiversity and natural values (Child 1996). To achieve this, it is usually necessary to encourage private sector investment and provide local communities with a vested interest in wildlife tourism.

Box 3.3: Management and Tourism in Kruger National Park, South Africa

Kruger National Park lies in the north-east of South Africa, and is one of the largest and oldest protected areas in Africa. It was declared in 1926 and now has an area of 19,458 sq. km. Kruger is wooded and subject to periods of drought that follow 20 year patterns. Kruger is controlled by the National Parks Board, and throughout its history has been managed under a policy that espouses minimum interference in natural processes and that promotes a non-consumptive tourist industry. Nevertheless, because an area even as large as Kruger is affected by factors outside its borders, significant management interventions have been undertaken in the park, including:

- regular early burns;
- provision of water, through boreholes;
- fencing and enlargement of the ecosystem, particularly through the increasing involvement of privately owned properties and reserves bordering its western boundary (see Box 3.7);
- culling, particularly of large herbivores dominant in the biomass, namely elephants, hippos and buffaloes;
- species reintroductions, to restore key species that were absent at proclamation including two species of rhinoceros.

These management actions aim to retain the delicate balance in the biomass of large herbivores that the dry and artificially watered habitats within the Kruger ecosystem can support in times of drought (Walker *et al.* 1987). Calls are increasingly made by animal welfare groups to halt the culling of elephants. In this climate, park managers face the future challenge of balancing policies towards different species, and towards management practices such as artificial provision of water.

Kruger has a highly developed non-consumptive tourist industry. There are eight entrance gates, a network of some 2600 km of tarred and gravel roads, 24 rest camps offering a variety of accommodation and camping facilities. The Skukuza camp at the park headquarters is the size of a town, with an airstrip served by a commercial airline, a restaurant, shop, bank, post office, conference centre, library, petrol station, workshop and car hire facility. Smaller camps are situated up and down the length of the park. The Kruger has 4200 beds and, with day visitors, can accommodate around 5000 visitors at any one time. The management places a limit of 1 vehicle per km of road at peak periods. Hence, Kruger takes an unashamedly populist approach, offering comfort and easy access to wildlife to many people. There is little of the classic African safari about a stay in the Kruger! Despite the massive tourist presence, the rest camps, roads and viewing bands that run alongside them, occupy only some 4 per cent of the total area of the park. The remaining area is unspoilt and left to nature. Some impacts are evident as a result of the roads and heavy tourist activity. Night driving vehicles can kill wildlife. For example, scrub hares are frequently killed as they feed on the short grasses at the road edges, and young animals may be left behind on embankments as their parent cross roads (Edington and Edington 1986). Nevertheless, these impacts are negligible given the area remaining undisturbed.

An average 520 vehicles per day visit the Kruger, totalling some 0.2 million vehicles and 0.7 million visitors annually. The revenue earned from tourism per sq. km is about 20 times higher than from Tsavo National Park, another similarly large protected area in Kenya and equivalent to the very small and highly subscribed Amboseli National Park (see Table 3.3). With its huge earnings, Kruger plays a central role in the financial strategy of the National Parks Board in subsidising the upkeep of the less visited national parks.

The earnings of Kruger from tourism exceed potential earnings if the same land was converted to different forms of land use, notably agriculture (Engelbrecht and van der Walt 1993). The National Parks Board also employs about 3000 staff in Kruger. Furthermore, 10 per cent of visitors to the park are foreigners who create some 9000 jobs in the formal sector and spend large sums in the national economy. In addition, the 90 per cent of South African visitors to Kruger generate some 4000 jobs and spend further sums in the national economy. Kruger also has an important impact in a regional context. Much of the activity in the surrounding private reserves and hotels is due to the existence of Kruger. Despite the overwhelming economic evidence in favour of retaining Kruger under its current use, the net social benefits appear to be distributed inequitably amongst different levels of South African society. This issue requires urgent attention given the concern of the new majority government for local communities (Hanekom and Liebenberg 1993).

Table 3.3: Visitors to Kenya's Protected Areas

Park/Reserve	1977	1991	% Change
Aberdare NP	46,050	56,300	22
Amboseli NR	82,333	189,200	130
Buffalo Springs NR	31,364	?	?
Nairobi NP	141,861	168,800	19
Tsavo East NP	64,358	135,900	111
Tsavo West NP	82,537	119,300	45
Meru NP	36,945	9,100	-75
Lake Nakuru NP	90,012	174,400	94
Maasai Mara NP	53,261	193,714	264
Shimba Hills NR	12,112 ¹	38,200 ²	215

Notes: 1: data for 1978; 2: data for 1989

Source: cited in Moran (1994).

Box 3.4: Tourist Impacts on the Galapagos Islands

The Galapagos Islands are well known for their natural beauty and their unique wildlife made famous by Charles Darwin. In 1959, around 90 per cent of the land area was designated a National Park, which now consists of 11 large islands and numerous small islands. The Galapagos were inscribed as a World Heritage Site in 1978.

Tourism began on a regular basis in the late 1960s. The islands can be reached only by boat or air. The majority of tourists arrive by air to the islands of Baltra or San Cristobal, and from there transfer to cruise ships or go by bus to the capital, Puerto Ayora, on Baltra - the centre for hotels and daytrips. Only a small part of the total area of the park is open to tourists. In the early 1970s, the Galapagos National Parks Service (GNPS) introduced well-planned tourist trails and ensured that all tourist groups are accompanied by a naturalist guide in order to limit visitor impact. In the late 1970s, GNPS set a limit of 12,000 visitors annually. However, by the late 1980s, the number of tourists visiting the Galapagos every year was over 50,000. The dramatic increase in the number of tourists has resulted in pressure to open up other areas and islands.

Although the coastline of the archipelago is long, there are few landing sites because of the rough terrain. Therefore, human impacts tend to be concentrated at these landing sites (Tindle 1983). The number of visitors seems to have little impact on the breeding success of sea birds living in colonies in tourist areas. Breeding rates appear to fluctuate enormously from year to year, but these fluctuations appear to correlate with differences in marine productivity rather than visitation levels. Similarly, there appears to be no observable changes in chick rearing and incubating behaviour of the flightless cormorant, masked and blue-footed boobies and frigate birds, when comparing visited and non-visited colonies (Tindle 1983).

Short-term studies showed that the behaviour of three species of boobies did change when tourists were present (Burger and Gochfeld 1993). These behavioural changes are subtle and not immediately obvious. However, with repeated passage of groups of tourists the birds can be disturbed for much of their day.

There have also been noticeable long-term impacts on the fauna and flora (Boo 1990). Albatrosses at Punta Suarez have changed the location of their nesting sites away from tourist routes. Sea-lions have shown increased aggression and nervousness. There has been trail erosion, particularly near landing sites. Litter is dumped on the islands including that dumped close to shore by tourist boats and cruise ships, and then washed up onto the beaches (de Groot 1983). Some turtles have been reported to swallow plastic bags, mistaking them for jelly fish, and then subsequently die. Tourists have also fed animals to such an extent that, when this was stopped, the animals were unable to locate their natural food sources. Coral reefs have also been raided for souvenirs.

Box 3.5: Rubbish from Tourists Defaces Africa's Highest Mountain

Mount Kilimanjaro is the highest mountain in Africa, and the view of its majestic snow-covered peak is recognised throughout the world. The mountain is a natural focal point for much of Kenya and Tanzania, and a source of water for surrounding areas. The ecosystem of Mount Kilimanjaro is a succession of distinct vegetation zones around the mountain, rising from montane forest to alpine desert and the snow-covered summit. A number of endemic plants, including giant groundsel and lobelias occur on the mountain. The land above 2700 m was declared as a national park of 753 sq. km in 1973, and as a World Heritage Site in 1989.

Mount Kilimanjaro was officially opened to visitors in 1977. The numbers of tourists climbing the mountain has since increased steadily, and almost 12,000 people visited the park in 1991. Hikers use one of five trails and spend approximately 4 nights and 5 days on the mountain. Each hiker requires 2 porters. Hence, approximately 36,000 people and 180,000 person days are spent on the mountain annually. The charges for entry and hiking on Mount Kilimanjaro are higher than for entry into Tanzania's other national parks. A number of problems are associated with the current level and management of visitors, including extensive erosion and degradation of trails, spillage of sewage from huts, accumulation of rubbish and lack of refuse collection, use of fuelwood for cooking, and overbooking resulting in use of natural caves for shelter. These various problems cause, amongst other things, damage to endemic plants, lowering of water quality, and unsightliness. In 1993, two visitors counted nearly 4500 pieces of rubbish, comprising wrappers, cigarette packets, toilet papers and plastic items, along a 10 km stretch of trail, or 450 items per km. This estimate did not include rubbish hidden under bushes. Even though horror was expressed at the scale of littering on Kilimanjaro, a philosophical position was adopted, with comments to the effect that tourists litter wherever they go, always have, and probably always will, and recognising that the situation is probably not as bad as on some of the Himalayan tourist routes (Harcourt and Stewart 1993).

Nevertheless, a recent management plan recognises that these and other problems need to be corrected for Mount Kilimanjaro to retain its exceptional natural, cultural and biological attributes for visitors. The core of the plan comprises zoning for different levels of use, and defining limits of acceptable use (LAU) for each zone. The plan aims to reduce the use of the main trail, but to maintain overall revenue by increasing park entrance fees, by increasing fees in the peak seasons, and by requiring a minimum 5-night stay (Tanzania National Parks 1993).

3.3 Private Sector Involvement in Wildlife Tourism

National parks and other state-owned and managed protected areas are major destinations for wildlife tourists. However, the private sector is playing an increasing role in providing accommodation, facilities and other support services within these areas. The private sector is also involved in managing and utilising wildlife, and providing tourist facilities on privately owned land (Boxes 3.6 and 3.7).

Private sector involvement in developing tourism in protected areas can be subjected to much criticism and heated debate. However, in many developing countries, governments lack the capital to develop a tourist industry. Hence, private sector funding becomes a necessity if the benefits of tourism are to be realised. Private sector involvement may not be appropriate in all aspects of managing or regulating tourism activities within a state-owned protected area, but in some aspects of tourism development private sector funding may not only be acceptable but also necessary. Thus, the state has a responsibility to retain ownership, management and regulation of protected areas on behalf of the nation. However, the private sector has a clear role in the development of support services and construction and management of tourist service facilities such as restaurants, car hire and retail facilities (Fowkes and Fowkes 1992).

There are, in addition to state-owned protected areas, many reserves that are privately owned. In South Africa there are an estimated 800 private game reserves, ranging from luxury resorts such as Londolozi in the eastern Transvaal to small "tribal resource areas" in the former homelands (Koch 1994). Many private reserves are of particular conservation significance because they are located

Box 3.6: Game Ranching in Zimbabwe

Over the last decade, there has been a rapid increase in wildlife ranching and associated tourist activities on commercial farms in Zimbabwe in response to a strong overseas demand for this sort of tourism (Heath 1992). Game ranching has long been an important form of land use for private landowners in Zimbabwe's marginal areas. However, since the economic returns from game ranching have been relatively low, ranchers have increasingly converted to tourism as a more profitable enterprise. Even on prime agricultural land, farmers are increasingly turning farmland over to wildlife and offering tour facilities and accommodation. A Wildlife Producers Association was formed in 1986 to promote this type of development and by 1994 had 500 members, 50 per cent of whom had become involved in tourism. In 1990, 80 farmers formed the Wildlife Producers Co-operative which has its own travel agency and actively markets ranch tourism under its trade name "Safari Farms" (Melvor 1994).

Box 3.7: Conservation Corporation Africa

Conservation Corporation Africa (ConsCorp) is a private company which develops wildlife tourism destinations in sub-Saharan Africa. The company was founded in South Africa in 1990 with the primary aim of using "ecotourism" to attract investment capital and tourism revenue to remote parts of the sub-continent. By 1993 ConsCorp represented the biggest private investment in conservation in southern Africa with both South African and international investors.

A far cry from the harsh realities of life in the African bush, ConsCorp develops luxury lodges, hotels and camps and offers holidays so exclusive they often take place in areas from which the local residents have been excluded!

ConsCorp works with both the private and state sector and local communities. In 1992 it established a "Rural Investment Fund" which provides a channel for international investment in rural development projects around the core industry of wildlife tourism.

Source: ConsCorp promotional literature; Fairley 1996.

around state-owned parks and other protected areas, thus serving to increase the effective protected area of many parks (Alderman 1992). In Latin America, the emergence of privately owned protected areas is an important phenomenon that has received little attention in the literature (Boo 1990). In many cases, private reserves are operated by concerned individuals and organisations conscious of the environmental impacts of tourists and the need to preserve an area in its natural state. In Costa Rica, private investment in tourist enterprises has been encouraged since the government has lacked the funds to develop national parks and protected areas (Rovinski 1991; Box 3.8).

Private sector involvement in wildlife tourism may often be dependent on high levels of foreign investment, as the costs of establishing private reserves are relatively high (Alderman 1992). Restrictions on foreign investment may therefore have an impact on wildlife tourism. Countries with large numbers of private reserves tend to be those which permit foreigners to own land, for example in Costa Rica. Where international investment is not restricted, wildlife tourism can mean big business (Box 3.7).

3.4 Local Participation in Wildlife Tourism

Increasingly, it is recognised that effective local participation is an essential element of sustainable wildlife management, linking wildlife tourism to conservation with development (see Giongo *et al.* 1993; IIED 1994). Participation has been identified as a necessary component of sustainable development generally and ecotourism specifically (Drake 1991). However, the benefits accruing to local communities from tourism are often overstated (Giongo *et al.* 1993; Cochrane 1994; Box 3.9). In theory, benefits may accrue under one of two scenarios. First, by linking local people living outside protected areas to tourism initiatives occurring within those protected areas through benefit sharing schemes. Second, by establishing community-based tourism initiatives on communally owned land outside formally protected areas.

In reality, not much tourism revenue accrues to local people from protected area management, and linkages achieved with efforts to integrate protected areas with local communities have been disappointing (Box 3.9). As a result, there is little or no incentive for local people to support conservation within protected areas. For example Khao Yai National Park in Thailand generates \$5 million per year in tourism revenue, virtually none of which goes to local people (Fenandes 1994). However, government policy in certain countries is moving towards more participation in wildlife tourism (e.g. Box 3.10). In Kenya, for example, the government has developed a number of policies aimed at increasing local participation in the development of tourism, providing financial incentives through benefit sharing with local communities to protect neighbouring tourism sites in protected areas, and encouraging domestic tourism in order to build Kenyan support for conservation of protected areas (Olindo 1991; Lusiola 1996). In South Africa, the Tourist Board (Satour) has stated that it will ensure that community participation is an essential requirement in applications for wildlife programmes to finance institutions (Koch 1994).

Community-based tourism outside protected areas is receiving increasing attention from a variety of sectors as a way to bring economic and social benefits to communities (Ashley and Garland 1994; Ashley and Roe 1997; Box 3.10). Local participation in wildlife tourism may take a number of forms, and wildlife tourism can be a major vehicle for realising tangible benefits of wildlife conservation for the local communities on whose land the animal populations occur (Heath 1992). Political support is an essential requirement for effective community-based participation, not just in tourism but in all aspects of wildlife management on communal land. Vital issues include deciding appropriate institutional structures and determining rights to ownership of resources (see IIED 1994). If these issues are overcome successfully, the development of tourism on pastoral land outside protected areas in northern Tanzania may have benefits both for the neighbouring protected areas and

for people on whose land tourism is managed (Box 3.11). Firefly watching in Malaysia is another unusual example of community participation in wildlife tourism, and illustrates a number of important lessons for wildlife tourism development as a whole (Box 3.12). Some of the key requirements for successful participation in wildlife tourism initiatives are given in Box 3.13.

Box 3.8: Monteverde Cloud Forest Preserve, Costa Rica

Monteverde Cloud Forest Preserve is a 100 sq. km site originally settled by North American Quakers in the 1950s. It was founded as a nature reserve in 1972 by a Quaker conservation group, Bosque Eterno, and the Tropical Science Center, a Costa Rican non-profit organisation, which now own and manage it. The area is home to many endangered species and was initially visited only by scientists and researchers. However, their accounts in scientific journals, and then in the popular media (most notably a BBC documentary released in 1978), gradually attracted more and more visitors. Numbers grew from 300 in 1973, to 17,500 in 1989, and to nearly 50,000 in 1992 (Aylward *et al.* 1996).

Most of the tourists to the Preserve are foreigners, although domestic tourists make up about 15 per cent of the visitors. Entrance fees as well as revenues from a gift shop and restaurant cover the costs of administration, maintenance, research and development and an extensive environmental education programme. Monteverde is now the most frequently visited wildlife reserve (either publicly or privately owned) in Costa Rica, with just under 25 per cent of its international visitors travelling to Costa Rica specifically to visit the Preserve (Aylward *et al.* 1996).

One of the key species that tourists wish to see is the quetzal. However, trails are temporarily closed where quetzals are building nests, since they are easily disturbed by tourists during this period. When the females are incubating eggs, they appear to be more tolerant of visitors and so the trails are re-opened (HaySmith and Hunt 1995).

Box 3.9: Linking Protected Area Management with Local Communities

Integrated conservation development projects (ICDPs) are intended to promote socio-economic development and provide local people with income sources that do not threaten the natural resource base. A number of these projects have a wildlife tourism component. However, the results of tourism components of ICDPs have often been disappointing, as "it is unusual for any of these tourism revenues to be returned directly for park management and extremely rare for a revenue share to go to local people" (Wells and Brandon 1992). Some of the case studies examined by Wells and Brandon highlighted this problem:

- "Tourism and safari operations, although successful revenue earners for the ranch, have not yet brought much benefit to local populations." (Nazinga Game Ranch, Burkina Faso);
- "Community involvement in decision-making and the distribution of local benefits has not been widely participatory at the local level." (ADMADE programme, Zambia);
- "Local people are only marginally involved in tourism. Overall, the park imposes considerable hardships on local communities." (Royal Chitwan National Park, Nepal).

It would be instructive to conduct a follow-up study to see if the situation has changed in the five years since the report by Wells and Brandon was published.

An important issue in developing tourism on land occupied by local people is the possible conflict between the cultural beliefs and requirements of residents and visitors. In one particular situation in the Inuvialuit Settlement Region, in the Northwest Territories of Canada, a prime concern is tourist attitudes towards native use of wildlife, especially hunting, whaling, fur-trapping, using non-traditional hunting weapons and non-traditional modes of travel (Talarico 1989). If tourism is to be promoted in this area, local communities will have to develop a strategy for dealing with this problem of tourist perceptions. This could include educating tourists beforehand to the modern day lifestyle of the Inuvialuit or, alternatively, keeping wildlife tourists out of contact with local communities through zoning. In a different situation, 63 per cent of local people in the Luangwa Valley, Zambia, felt that tourism had caused the prevention of traditional hunting and fishing practices in their community. However, this view appeared to be strongest in those communities that had not benefited financially to any significant degree from tourism. In community workshops, people commented that "culturally protected" animal species were being killed by safari hunters. Hunters can purchase a license to shoot eland, yet this animal, known locally as *Nsefu* after one of the chiefs, is protected under traditional tribal law (Butler 1966). Again, better integration of cultural values is required if the positive benefits of tourism are not to cause resentment among local people.

Box 3.10: Namibia's Community-Based Tourism Policy

Tourism is the third largest income earner in Namibia. The government recognises that it is a vital industry that must benefit local people in order to encourage them to conserve the environment on which the industry depends. The community-based tourism policy explores ways in which communities can benefit from tourism to promote social and economic development and conservation in communal areas. Its main principles are:

- people must be consulted and their ideas included in tourism planning and legislation;
- legislation should assist and support tourism development;
- the informal tourism sector should be organised and recognised as representing community interests; and
- large businesses operating on communal land should involve and benefit local residents, who often gain little from wildlife and tourism on their land.

In the policy, the Namibian Ministry of Environment and Tourism commits itself to:

- increased representation of local people in tourism activities through groups such as the Namibian Community-Based Tourism Association;
- prioritising community interests in tourism planning;
- supporting tourism enterprises run by local communities;
- promoting maximum benefit to communities from private sector enterprises on communal land;
- enhancing local people's rights over tourism resources, e.g. through wildlife conservancies;
- investment in communal areas; and
- ongoing promotion of community-based tourism development through the appointment to the Ministry of a Community Tourism Officer.

Source: Ministry of Environment and Tourism (1995).

Box 3.11: Models for Community-Based Tourism Among Pastoral Communities in Northern Tanzania

Two tourist safari companies initiated three community-based conservation projects in areas next to Tarangire and Serengeti National Parks in 1990. Both companies offer a low volume, low impact wilderness experience with walking as an option. These projects attempt to combine business and community interests, with wildlife conservation as the eventual outcome. In these areas, rural expansion, increased charcoal production and mining, with associated illegal offtake of wildlife populations, have jeopardised the integrity of park ecosystems. If not reversed soon, these pressures will result in the loss of wildlife resource options. A particular concern is the increasing isolation of Tarangire, where migratory wildlife populations use areas well outside park boundaries (Borner 1985).

Pastoral peoples living in these areas are under increasing pressure, as population densities increase due to convergent trends of loss of land area and population increase. Subsistence pastoral economies are no longer viable in many cases, and pastoral purchasing power in the market economy has deteriorated. These pressures force local people to seek alternatives, which in most cases is perceived as agriculture, the long term viability of which is questionable.

These projects have attempted to set a small scale precedent in which wildlife conservation becomes an option available to local communities - who are credited historically with custodianship of world famous wildlife areas. Both companies sought an official and legal basis for establishing their projects, which depended on meeting two primary conditions. First, securing the approval of and support from the central wildlife authorities to excise the tourist areas from existing hunting concessions, as non-consumptive game-viewing tourism conflicted directly with hunting. Because the proposed areas covered only 2 per cent of the area of existing hunting concessions, the revenues generated from tourist hunting would not be significantly reduced. Second, the procuring by villages of legal title deeds for 99 years to their respective traditional land areas. This, in turn, allowed the companies to enter into negotiations with village governments to agree legally binding land use contracts. The use of some 250 sq. km of village land next to Serengeti and some 440 sq. km next to Tarangire was negotiated. The areas were selected using the following criteria and justifications:

- suitability for marketing, with scenic and wilderness character offering walking and wilderness experience;
- absence of existing land use, such as agriculture that conflicted with wildlife conservation, and minimal human impact;
- important components for long-term integrity of the Tarangire and Serengeti ecosystems;
- on the village periphery where pressures on village governments are highest to allocate large scale farms to outsiders. Hence, in reaching contractual agreement, it was the responsibility of one village council to reallocate 48 sq. km of farmland that had already been agreed to (but not yet developed) in the area next to Tarangire.

Contracts signed by companies and village governments are legally binding use agreements, where ultimate control remains in the hands of the village as title holders to the land. Annual payments and visitor night fees are paid to villages in return for exclusive control of tourist activities. The exclusive clause is controversial, but critical from a marketing perspective to guarantee a specific product to prospective tourists. In addition, the following conditions were included as mutual contractual obligations:

- villagers continue to use the areas for seasonal grazing but not for agriculture or permanent settlement;
- charcoal production, hunting and live bird capture are no longer carried out;
- companies develop no infrastructure, except access tracks and campsites; and,
- company activities are limited solely to those related to tourism and natural resource conservation.

Source: Dorobo Tours and Safaris and Oliver's Camp (1996).

Box 3.12: Firefly Watching in Malaysia

Firefly watching first began to develop in the late 1980s after local villagers in Kampung Kuantan, Selangor State, drew the attention of a local conservation organisation to the extraordinary phenomenon of synchronised flashing between trees inhabited by the fireflies. Large colonies of the species *Pteroptyx tener* occur in highly localised tidal reaches of the Selangor river. They are found only on one species of mangrove, *Sonneratia caseolaris*, on whose leaves they feed.

Initial interest in the discovery was restricted to a limited number of biologists, conservationists and amateur naturalists in the Kuala Lumpur area, who paid local boatmen on an informal basis to take them to view the fireflies. Gradually, a partnership formed between local conservation organisations and the local boatmen of the village. A nearby nature reserve agreed to allow local people to use their amenities to provide interpretation and booking facilities for firefly-watching. As interest grew, so did employment for local boatmen, and because the mangroves banks are sensitive to erosion, villagers agreed amongst themselves not to use power boats and access to the river remained the sole preserve of traditional, non-motorised boats.

Until recently, this example of community-driven wildlife tourism appeared to be an unqualified success story. Unfortunately, things are now beginning to change - the fireflies, and communities who depend upon them, face an uncertain future as the initiative has become a victim of its own success. While the fireflies are by far the largest source of income and employment for the village, internal rivalries have meant that the village has actually been divided by the advent of tourism revenues. Tensions have now developed within the community, between those villagers who benefit from tourist revenues (principally households with boatmen who are part of the company that now controls access to the fireflies), and those who don't. Unless a compromise can be found to enable all villagers to benefit from the fireflies, further conflict is likely to ensue. Already, rival groups from within the village, and from other nearby villagers, are using powerboats to bring visitors to the mangroves, a process that could be damaging for the fireflies and their riverine habitat. Worse still, village level efforts to protect, manage and replant the mangroves along the river banks have been suspended as relations between villagers have deteriorated. This comes at a time when the riverside vegetation on which the fireflies depend is gradually being cleared to make way for river access and for other tree crops.

Nonetheless, the benefits that tourism has brought to the village remain under the control of local people, divided though they now may be. Local government agencies and conservation organisations avoided the temptation to 'take over' the project, and instead opted to provide support for the efforts of local people to plan, manage and benefit from their own local wildlife resources. The results have been of enormous economic benefit to the village and regional economy, and have contributed to diversifying the national tourist industry in a most unique way.

Source: Hughes, R (1997).

Box 3.13: Critical Issues for Eliciting Participation in Wildlife Tourism

1. Empowerment as an Objective:

- Most wildlife tourism projects emphasise a beneficiary approach, in which local people receive benefits but are not empowered. Wildlife tourism planners need to involve people in decision-making and planning and so empower them to exercise greater control over their lives.

2. Participation in the Project Cycle:

- The process of participation should begin as early as possible in the project cycle and continue throughout, from information-gathering to project evaluation.

3. Creating Stakeholders:

- Local people, both individuals and communities, should have a sense of ownership in wildlife tourism projects through local investment, control and decision-making.

4. Linking Benefits to Conservation:

- The economic benefits to local communities from any tourism activities should be clearly linked to protecting the resource base.

5. Distributing Benefits:

- Tourism projects work best when a high level of benefits can be provided to many people and when there is evidence to them that these benefits are sustainable.

6. Identifying Community Leaders:

- Project managers need to identify and gain credibility with community leaders, and need to be aware that there are many kinds of leaders and many sources of power within a community.

7. Using Change Agents:

- Using change agents (outsiders affiliated with conservation, development or wildlife tourism) is often the fastest way to change local ideas, technologies and introduce new activities into communities.

8. Understanding Site-Specific Conditions:

- There are no models of wildlife tourism or community participation that will work everywhere.

9. Monitoring and Evaluating Progress:

- Developing some key objectives and indicators for the activities initiated can allow projects to measure the impact of their social and economic development activities, and conservation objectives, so as to provide useful input for future planning.

Source: Brandon (1993).

3.5 Consumptive Forms of Tourism

In line with rising environmental consciousness (see Chapter 2), it might be expected that participation in non-consumptive activities would increase relative to consumptive activities. It is perhaps ironic that a recent study assessed the sustainability of five cases of wildlife utilisation involving some tourism (Prescott-Allen 1996): vizcacha hunting in Argentina; kangaroo hunting in Australia; fur-bearer trapping in Canada; squirrel monkey viewing in Costa Rica; and CAMPFIRE in Zimbabwe. Surprisingly, only the non-consumptive example (squirrel monkey viewing) was considered to be unsustainable. However, many would view this as the only true form of ecotourism among the five examples, because of the difficulty people have in accepting that the killing of animals and consumptive use can play a role in tourism. Hence, hunting is not included in much of the literature on wildlife tourism initiatives.

Equally, Safari Club International reports a rapid growth in both domestic (North America) and international (Africa) hunting, estimating that as many as 33 per cent of its 20,000 members worldwide go to Africa to hunt every 12 to 18 months (Jackson 1996). Sport or trophy hunting attracts a low volume of high paying clients, both domestic and international, who can make considerable contributions to wildlife authority revenue and to local communities. Hunters argue that well-regulated trophy hunting has the least negative impact of all forms of ecotourism. Hunting requires very little infrastructure, provides high per capita economic returns and assists in the management of wildlife populations as the animals collected by trophy hunters are usually biologically surplus males (Jackson 1996). Tourist hunting can also provide significant benefits to local communities (Box 3.14), particularly in some communal lands suited to hunting operations but unsuitable for wildlife viewing tourism due, for example, to their remoteness, insufficient wildlife populations, or generally low interest habitat (Price Waterhouse 1996). As with non-consumptive tourism, particular species are of special importance in the trophy hunting industry. For example, the big cats, elephants and buffalo make a large contribution to game fees in Tanzania (Table 3.4).

**Table 3.4: Contribution of Key Species to
Total Game Fees in Tanzania (1992)**

Species	Contribution to Game Fees (%)
Lion	12
Leopard	12
Buffalo	12
Zebra	8
Sable	4
Greater Kudu	3
Lesser Kudu	3
Gerenuk	3
Oryx	3
Elephant	2
Roan	1.5

Source: PAWM (1996a).

Nevertheless, trophy hunting may be incompatible with other forms of wildlife tourism in certain areas, since it can make some species extremely shy and therefore difficult to see. Most national parks, which largely promote non-consumptive tourism, do not permit trophy hunting for this reason. Equally, with careful zoning, hunting and wildlife-viewing have been combined in certain national parks (Anderson 1983). Sport hunting has, however, more commonly been a component of wildlife

Box 3.14: Benefits of Tourist Hunting to Local Communities

An African tourist hunting safari is seen by American hunters as an ecologically sound activity that can benefit local people in a number of ways:

Improvement of the environment: trophy hunting can provide economic incentives to rural villagers to regard wildlife as an asset rather than a liability. This encourages villagers to maintain their local wildlife within a pristine and natural environment. The presence of an active safari hunting operator can stimulate wildlife and habitat preservation. Furthermore, hunting is an important source of government revenue for wildlife and habitat conservation.

Provision of food: trophy hunters often produce meat for local people and can help reduce and control crop damage. Trophy hunting can create incentives that favour wild game over domestic animals. Wildlife withstands droughts and tsetse flies better than domestic animals, and is much less demanding on the ecosystem.

Provision of water: a safari hunting operator will establish a predictable and secure source of water in the most arid areas. This can mean drilling wells that local people as well as wildlife can use. In some instances, safari licences provide the revenue used for drilling wells.

Alleviation of poverty and provision of employment: trophy hunting can turn wildlife from a liability into an asset. It can maximise the benefits from wildlife that is under-utilised. Consequently tourist hunting can have a very profound effect on rural poverty. Tourist hunting directly employs a large number of people who may not otherwise contribute to the local economy. Running a hunting safari requires many duties and tasks, ranging from camp construction to trophy preparation. Tourist hunting may be the primary sources of income for a village, and the income of local people can more than treble in relation to the average national income. Hunting requires little or no infrastructure, and no other activity has the same potential as trophy hunting to improve the quality of life of rural people.

Enhanced role for women: with the development of small businesses, women can sell agricultural products, jewellery, pottery and other items. Indirectly women benefit as men in the village come into a new position of contribution. Husbands and sons who play an important role in the hunt increase their self-esteem. This changes the relationship with their family.

Health and medicine: safari companies are usually the main provider of health care to rural people living in remote areas. A safari company can add decades to rural human life expectancy, particularly of children. Simple medications reduce a great deal of suffering caused by malaria, diarrhoea, eye infections, and so on.

Small business enterprise: many ancillary businesses can be built around the safari hunting industry such as promotion of local arts and crafts, pottery, jewellery and clothing, entertainment, transportation, taxidermy, and road and bridge building.

Agriculture: tourist hunting can have a scarecrow effect on wildlife that is in conflict with man, and help to keep it off the fields. Hunting can also provide the revenue and incentive for rural people to tolerate and overcome the effects of crops damage. Hunting can reduce the dependence upon crops, and rural people can derive income from the safari operator for the sale of agricultural products such as corn, vegetables and fruits.

Source: Jackson (1996).

utilisation in protected areas classified in lesser categories of protection than national parks (see Table 3.2), particularly where there is no possibility of attracting sufficient volumes of game viewing tourists (see Box 4.3). Furthermore, trophy hunting is an important component of tourist potential on privately owned reserves and on communal lands, particularly in southern Africa (Cumming 1991; Bond 1994).

The opponents of consumptive use can argue that similar benefits to conservation and local people could equally be derived from non-consumptive wildlife tourism. However, wildlife viewing tourism is more likely to show symptoms of impact than hunting tourism as more tourists are needed to produce a similar income (BMZ 1995). Equally, in the long term and later in the tourist development cycle (see section 2.2), the economic returns may be greater from wildlife viewing than from hunting. In the early 1980s, one maned lion in a heavily visited area was estimated to be worth US\$15,000 over its lifetime for tourist viewing compared to only US\$ 8,500 for trophy hunting (cited in Dixon and Sherman 1990). In Namibia, wildlife production for non-consumptive wildlife viewing on private land yielded greater economic value than livestock/wildlife production for consumptive uses (Barnes and de Jager 1996). Examples of the transition from consumptive to non-consumptive use are illustrated in this paper. One, more complete, is now occurring outside Gona-re-zhou National Park in Zimbabwe (Box 3.15). Another, more gradual, is in Selous Game Reserve in Tanzania, where the uptake in game viewing tourism is likely to take a long time to match the earnings from hunting (Box 4.3).

3.6 Ecotourism Requirements

Proponents of ecotourism often assume that its activities are environmentally benign. This assumption is made because tourist group sizes in what are considered ecotourism situations tend to be small and because the visitors are interested in aspects of the environment and are therefore assumed to respect it (Wall 1994). Visitors may be encouraged to "take only photographs, leave only footprints", but even footprints make their mark, particularly in fragile environments such as Antarctic moss-banks. The fact that tourists have chosen an expensive wildlife-based holiday does not necessarily mean that they care about the long-term impact of their tours. Many feel that they have paid a lot of money for what they perceive as a great adventure, and assume that they have an inalienable right to see and do what ever they want (Panos 1995). Furthermore, as already noted in section 2.2, the environmental and social impacts of ecotourism may be more significant than mass tourist developments since ecotourism tends to take place in unspoilt environments that are often ecologically fragile, contain rare species and may be inhabited by indigenous people (Cochrane 1994). The impact per capita may therefore actually be greater for ecotourists than for mass tourists (Wall 1994). In addition, ecotourists want to escape from other tourists, and so by its very nature, ecotourism can raise the risk of 'hit and run' tourism: an influx of nature lovers to the latest wild spot, followed by its abandonment once discovered and degraded by other tourists (Western 1993).

Ecotourism has been variously defined (Box 1.1) and misunderstood (Chapter 1). However, no definition cited in Box 1.1 excludes any category of land from supporting ecotourism. All definitions of ecotourism emphasise that it must take place in natural areas, which could therefore include state-managed protected areas, private land and communal land. The key criteria for ecotourism are that the activity must be environmentally and culturally sensitive, must directly benefit conservation and/or local people who in turn have an incentive for conservation, and be self-sustaining within the context of the natural and cultural habitats in which it takes place (e.g. Goodwin 1996).

Under the definitions of ecotourism, any of the forms of wildlife tourism outlined in sections 3.2 to 3.4 could be classified as ecotourism, if they were run and managed in such a manner to fulfil the

Box 3.15: Consumptive and Non-Consumptive Tourism: The Role of a Hotel Group in Mahenye, Zimbabwe

Much revenue flowing into CAMPFIRE (Communal Areas Management Programme for Indigenous Resources) areas in Zimbabwe derives from tourist hunting, particularly of elephants. Only about 1 per cent derives from non-consumptive tourism, near Matusadona National Park (Bond 1994). However, another CAMPFIRE area, Mahenye Ward, has recently made the change from non-consumptive to consumptive tourism based on the initiative of a hotel group.

Mahenye Ward borders the Gona-re-zhou National Park in the south east lowveld of Zimbabwe on the Mozambique border. Mahenye is a narrow wedge of land of about 210 sq. km between the Save River on the west and the Rupembi River forming the border with Mozambique. Chipinge Rural District Council is the Appropriate Authority and Mahenye Ward is communal land occupied by the Shangaan community displaced from Gona-re-zhou when the national park was created.

The Shangaan are traditional hunters and their land is unsuitable for both intensive and extensive agriculture. Fishing has been an important source of protein, but since the 1950s fish catches have been falling due to upstream irrigation schemes and siltation of the Save River, in part because of cattle ranch erosion in what is now the Save Valley Conservancy.

Relationships between the Shangaan and the national park authority became very strained when they were evicted from the national park. Resenting the loss of their homeland and resettlement on relatively impoverished land, the Shangaan people continued to hunt, then termed poaching, for protein within the Gona-re-zhou National Park. The Shangaan people believed that if there were no animals in the park, there would be no reason to preserve the area for tourists and they could have their land and hunting rights back. The elephant culls which took place in Gona-re-zhou were seen as an unnecessary waste of animals by the Shangaan people. In 1982 a consumptive tourism package was agreed between the national park authority and the community and there was a reduction in conflict, although some tension have continued at particular times since then.

The Zimsun hotel group opened Mahenye Safari Lodge in 1993 and Chilo Lodge in 1996. There are now 44 beds in two developments built on land leased from Chipinge Rural District Council acting on behalf of the Mahenye community. In the construction phase, 160 local people were employed for 7,300 person months and Z\$7.5m came into the local economy. Zimsun pays the community part of turnover rising from 8 per cent to 12 per cent over the 10 years lease. The lease payment for 1997 is expected to be Z\$250,000, the Chipinge RDC under CAMPFIRE rules will probably take an administration charge of 20 per cent and there is the first instalment of the electrification costs of the village to be deducted. The community will decide whether the balance is to be used for collective or household dividends, following the CAMPFIRE model for consumptive revenues.

The two lodges employ 38 local people, six of whom are women. Some US\$ 37,000 per year flows into the local community. In 1995-6 Mahenye Lodge sold 2,160 bed nights. The lodge guests are taken into Gona-re-zhou National Park for game viewing. The numbers are too small to have any adverse ecological impact and, with the changes in park fee structures at the beginning of 1997, the Zimsun guests are major contributors to the park.

Source: Goodwin *et al.* (1997).

objectives outlined in the definitions (Box 1.1). For example, when well-regulated, trophy hunting is undoubtedly a form of ecotourism (Jackson 1996). However, the scope of this report is not to consider whether ecotourism is achieving all its various objectives, in terms of revenue for conservation, benefits to local communities, and so on. Instead, it is to examine the nature of environmental impacts associated with all scales of wildlife tourism (see Chapter 1). Equally, if certain types of wildlife tourism thought of or promoted as a form of ecotourism are causing environmental impacts, then that activity is failing in at least one requirements in the definitions of ecotourism (Box 1.1). Therefore, the next chapter moves to a more detailed consideration of the available literature documenting environmental impacts associated with wildlife tourism.

CHAPTER FOUR

THE ENVIRONMENTAL IMPACTS OF WILDLIFE TOURISM

4.1 Nature of Impacts

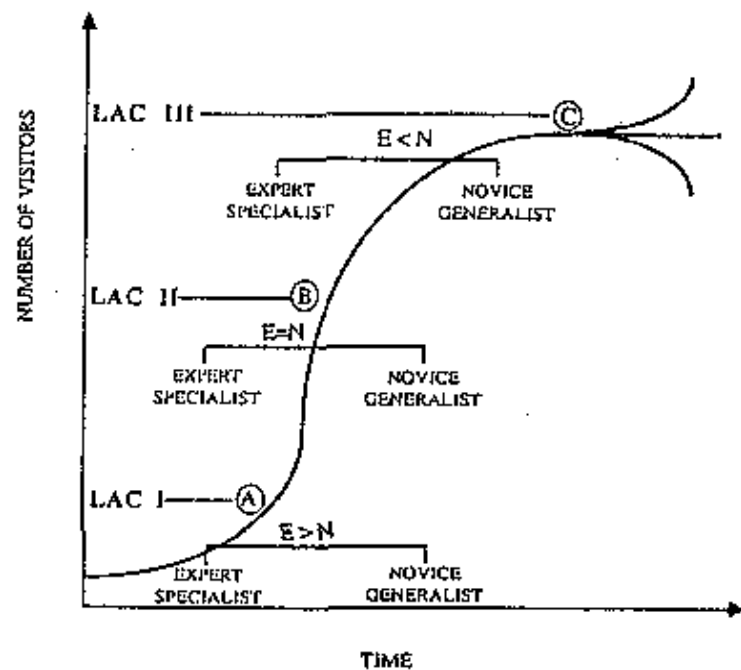
The nature of any disturbance to wildlife caused by tourists will depend upon a range of factors including its predictability; its frequency and magnitude; when it occurs within the daily activity cycle or life cycle of a particular species; and also upon the type of tourist activity, for example, foot safaris, boating, hot air ballooning. It has also been suggested that the impact of wildlife tourism is related to the type of tourist rather than to the type of activity or level of tourist development (Duffus and Dearden 1990). In wildlife tourism, the explorer stage (see Table 2.1) represents the wildlife specialists. These tend to be few in number, have pre-knowledge about the site and require little supporting infrastructure or interpretative facilities. However, as awareness of a site increases, the number of visitors to the site increases until they are dominated by general tourists relying heavily on supportive infrastructure and requiring increased management intervention (Table 2.1). This process of site development is also illustrated in Figure 4.1.

The type and magnitude of impact associated with wildlife tourism will also vary with the nature of tourist activity. Hence, a consumptive activity like trophy hunting has different impacts to non-consumptive activities such as wildlife photography. The impacts associated with many wildlife tourism activities may be obvious and easily identifiable, for example, the death of individual animals in trophy hunting. Equally, some impacts may be more difficult to identify, due largely to the inherent complexities of ecological systems, or the long term and cumulative effects of those impacts. In some cases, impacts may take the form of naturally occurring processes that have been accelerated by human interference. In other cases, the impacts arising from tourism may be insignificant compared with normal levels of natural disturbance. Four factors make it difficult to quantify human impact (Wall and Wright 1977):

- baseline data are often lacking;
- the role of humans and nature cannot always be disaggregated;
- cause and effect relationships may have spatial and temporal components which are not obvious; and
- individual components can not be isolated in complex ecosystem interactions.

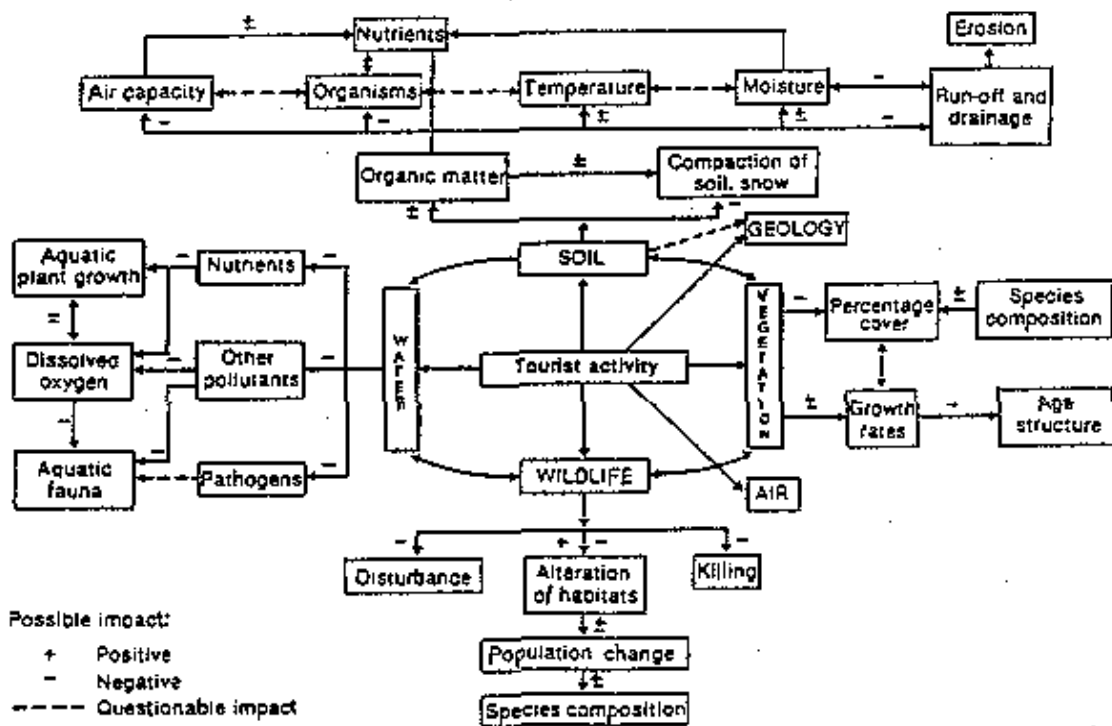
As a result, there are few studies that separate impacts due to tourists from other environmental disturbances (Shackley 1996). Even when an impact from tourism is quantified successfully, a further difficulty may arise in determining if that impact is biologically important in the long-term. Thus, a disturbed animal may feed or nest elsewhere, a road graded through woodland may quickly revert to woodland when that road is no longer used, and a sustainable quota for tourist hunting may have little effect upon population dynamics compared with normal levels of mortality. In such instances, it is likely that the impact will be assessed by value judgements made on purely aesthetic grounds, rather than against any technical criteria (see Bell 1983). Even if an impact from tourist activity or infrastructure is determined as significant, another difficulty arises in deciding if such an impact is the lesser of two evils. Thus, if it is judged necessary to conserve an area through economic incentives arising from tourism, it may be preferable to accept some tourism impact, rather than the perceived alternative, which may be rampant poaching or conversion of the land to other uses such as agriculture. Again, the assessment of acceptable impacts is likely to be made through value judgements on largely aesthetic grounds.

Figure 4.1: Relationship Between Use Specialisation and Site Development



Source: Duffus and Dearden (1990).

Figure 4.2: Direct and Indirect Impacts of Wildlife Tourism



Source: Mathieson and Wall (1982).

Impacts will arise from wildlife tourism, and all other forms of tourism, at regional, national and local levels, according to the scale of the development and the style of tourism. Some of the impacts arising from tourism, of which wildlife tourism is a part, have been discussed already in Chapter 2. This chapter aims to summarise the few studies that have quantified some form of environmental impact arising from wildlife tourism at local levels within wildlife areas. Impacts may be direct, for example through death or disturbance of wildlife; or indirect, for example, through changes to wildlife habitats, and these impacts may vary seasonally (see Figure 4.2).

4.2 Direct Impacts

Wildlife tourism has the potential to impact directly on wildlife (Giongo *et al.* 1993; Knight and Cole 1995), the effects depending upon the scale of tourist development, the nature of any resulting disturbance, the behaviour and resilience of wildlife to the presence of humans, and the subsequent habituation of species to visitors (Mathieson and Wall 1982). Keen wildlife tourists may intentionally seek out rare or spectacular species. Hence, bird-watchers, particularly the very keen "twitchers", actively compete to record the most sightings of species in the shortest amount of time, and a report of a rare species in a particular area can result in the influx of hundreds of visitors (Edington and Edington 1986). Interesting species may be disturbed to create a spectacle during a visit that is primarily intended for another purpose, for example the seeking out of pythons by local people in an area that primarily attracts bird watchers in India (Box 4.1). Furthermore, when tourist activities occur during sensitive times in the life cycle, for example, nesting, and when they involve close

Box 4.1: Bird Watching in Keoladeo National Park, India

Keoladeo National Park, in Rajasthan, India, was established in 1981, with an area of 29 sq. km. This area of seasonal wetland was formerly a duck shoot, and contains spectacular assemblages of some 280 flowering plants, some 360 species of birds and 27 species of mammal. Keoladeo has also been declared a RAMSAR site in 1981 and World Heritage Site in 1987.

Keoladeo is now an established tourist destination, and lies within the Golden Triangle, close to Agra and Jaipur. Some 120,000 visitors were recorded in 1996, 70 per cent of whom were local tourists and 30 per cent international tourists. Tourists move around the park by walking, cycles and rickshaws, and visitation is highly seasonal. Few tourist impacts upon wildlife have been recorded, except for disturbance to pythons. Tourists are taken to see basking pythons by both rickshaw drivers and local children, which may cause disturbance especially when children catch pythons for display to tourists.

The benefits to local people around Keoladeo are several, including jobs as local guides, and rickshaw drivers, as well as python viewing.

Source: Goodwin *et al.* (1997).

approaches to wildlife for the purposes of identification or photography, the potential for disturbing individuals is high (Box 3.1). However, the impacts on wildlife are often difficult to identify since animal responses to human disturbance differ between individuals, and even between situations for a single species (Vaske *et al.* 1995; Box 4.2).

Disturbance may occur to particular individuals or in particular situations and tourist sites, yet be of little overall importance to the species. For example, boat trips concentrated on small areas around lodges cause considerable local disturbance to wildlife in comparison with other tourist activities (Boxes 3.1, 4.3). Hippos in the Selous Game Reserve in Tanzania have been noted to be particularly

sensitive to disturbance since they rest during the day (Rohs 1991), while giant otters in Manu National Park in Peru appear similarly prone to disturbance since they feed during the day (Dunstone and O'Sullivan 1994). However, these activities are limited to a very small part of the species range, such that overall levels of disturbance by tourists to the species are low. In East Africa, balloon safaris are a now a feature of wildlife tourism in certain protected areas, and appear to cause considerable distress to particular species, notably buffalo and lion (Sindiyo and Pertet 1984). Equally, these species are both very widespread over Africa, and many occur in areas where balloons never venture. Furthermore, not all species appear to be disturbed significantly by tourists even within heavily visited areas. While Sulawesi black macaques and spectral tarsiers were significantly affected by tourists to the Tangkoko DuaSudara Nature Reserve in Indonesia (Kinnaird and O'Brien 1996), formal studies of time budgets of Indian rhinos and of ruddy shelduck in the Royal Chitwan National Park, Nepal, indicated some direct disturbance in response to tourism but judged that disturbance insignificant in both cases (Box 4.4). The major direct effects of wildlife tourism are described below.

Box 4.2: Impacts of Wildlife Tourists on Cheetah Behaviour

Cheetahs are thought to suffer badly as a result of tourism, because their diurnal activity pattern and relative timidity make them particularly susceptible to visitors disrupting their hunts and driving them from kills. In extreme cases, this could have serious implications for food intake and, consequently, the long-term survival of individuals and their young, a particular problem given their endangered status (Muthoo 1992). This contrasts with the situation for lions, for example, which generally hunt at night and are little disturbed by tourists. However, the effects of tourism on cheetahs vary by area, depending on such factors as numbers of visitors and visibility (Caro 1994).

Amboseli National Park in Kenya is small and heavily visited, provides good visibility and allows as many as 30 vehicles to crowd around a single group of cheetahs. A study in Amboseli in the early 1970s revealed significant disturbance to the daily activity patterns of cheetahs (Henry 1975, 1980). Some routine activities only occurred when vehicles were absent or fewer than six in number. Cheetahs appeared actively to avoid vehicles, delayed hunting in their presence, and were more crepuscular.

The Masai Mara in Kenya is also heavily visited, but visibility is lower and harassment is somewhat less than in Amboseli. Despite this, the cheetah population in the Mara is estimated to have declined by around 30 per cent since 1993. The cheetahs appear to have developed a stress-related disease similar to HIV which causes their immune systems to collapse (Richard Kock cited in *The Times* 1996). A study in 1978 in Masai Mara concluded that vehicles have some impacts upon the feeding behaviour of cheetahs (Burney 1980). Vehicles approached cheetahs to 17m and stayed for 18 minutes on average. This changed to 22m and 22 minutes on average when cheetahs were on kills. Some cheetahs tolerated vehicles while others fled, and the behaviour of tour drivers and their clients had a strong effect upon the disturbance caused to cheetahs. If a vehicle was driven straight at cheetahs, they were more likely to be disturbed than by an oblique approach. If clients talked loudly, cheetahs were more likely to move away than if they heard only mechanical sounds such as camera shutters. If clients got out of vehicles, cheetahs were more likely to be disturbed than if than if tourists remained screened by the vehicle. Nevertheless, the presence of vehicles sometimes helped cheetahs conclude successful chases, because the vehicle attracted the attention of prey. Equally, there have been cases of tourists frightening prey away or distracting cheetahs.

The Serengeti National Park in Tanzania is large, and in relative terms much less visited than Amboseli or Masai Mara. Harassment of cheetahs occurs, but infrequently (Caro 1994). Hence, these studies suggest that tourism generally appears to have only a very minor impact on cheetahs' survival in the wild, apart from in particular populations. Nevertheless, numbers of visitors to areas such as Amboseli and Masai Mara have increased greatly since the 1970s, and it would be instructive to repeat studies under this new pressure. Furthermore, the disturbance of feeding by cheetahs caused by other species attracted by tourists requires further investigation. In some cases, groups of tourists appear to have attracted flocks of vultures and, subsequently, lionesses, causing the cheetahs to abandon their kills. In other cases, hyenas have been reported to use tourist minibuses to locate cheetahs and steal their kills (Edington and Edington 1986; Lea 1988).

Box 4.3: Hunting and Game-Viewing in Selous Game Reserve, Tanzania

The present Selous Game Reserve has been subjected to a long and traumatic history of fluctuating human occupancy that has permitted the creation of a wildlife sanctuary of some 50,000 sq. km. The former inhabitants lived in small settlements, separated by considerable expanses of uninhabited bush, underlain by poor soils and infested with tsetse flies. The slave trade, accompanied by a trade in ivory, lasted from the Middle Ages until the end of the 19th century, and did much to de-populate the area. Tribal warfare and movement, rebellion against colonial masters and fighting early this century further reduced the population. Sleeping sickness epidemics and a socialist villagisation policy required concentrating scattered villages in collective settlements, further extending the remote wilderness area, and allowing successive colonial governments to increase the size of Selous. After Independence, the Government made the final adjustments to the present boundaries, mainly to protect the migratory elephants.

In the mid 1960s, the abundant wildlife in Selous was developed with tourism utilisation in the northern sector and trophy hunting based on block concessions in the remainder. Thus, Selous generated funds that financed its own development programme. An elaborate infrastructure and administration was set up, most of which began to collapse into disrepair and misuse from the late 1970s under regional administration. A ban on hunting from 1973 to 1978 coincided with the period when Selous lost many of its elephants and black rhinos to poachers. After these years of decline, Selous has now come full cycle to re-establish the same principles of conservation through controlled utilisation under central administration. The Selous Game Reserve is divided into 47 blocks of which two are devoted to game viewing tourism, and the remainder to trophy hunting. Selous Game Reserve has been recognised as being of international importance to the conservation of wildlife, through designation as a World Heritage Site in 1982.

Selous receives some 5000 game viewing tourists annually, who mainly fly in by charter aircraft to well appointed bush camps. The fees earned from game viewing comprised some US\$ 34,000 in 1991/92. At present there is no scope for much larger volumes of game viewing tourists, which would need to expand considerably to match the US\$ 0.9 million in fees earned from hunting in 1992, and of which 37.5 per cent is retained for management. The impacts associated with trophy hunting in terms of killing animals are obvious, but most of Selous retains an entirely wilderness character as a result of the minimal infrastructural requirements of tourist hunting. Equally, the impacts of game viewing tourism are not entirely benign. Disturbance occurs locally during boat trips on the river. Hippos appear particularly sensitive to disturbance by tourists in boats since they rest during the day (Rohs 1991).

Source: PAWM (1996a,b)

4.2.1 Disturbance of feeding and breeding patterns

The pressure of tourists searching out wildlife to photograph or to hunt can affect wildlife hunting and feeding patterns, and the breeding success of some species. In certain cases, these effects are immediately obvious, while in others there may be subtle disruptions that have long-term implications for behavioural and ecological relationships. Behavioural changes in three species of boobies, and the moving of their nesting sites by albatrosses, were subtle and not immediately obvious in short-term studies in the Galapagos Islands (Box 3.4). Nevertheless, the long-term significance of these subtle changes still remains unclear.

In some cases, the effects of disturbance by tourists are more immediately obvious. An increase of boat traffic has disturbed the feeding of giant otters in Manu National Park, Peru. Further

Box 4.4: Disturbance to Species in Chitwan National Park, Nepal

The Chitwan Valley was first protected as a royal hunting reserve in 1846. In 1951, the Chitwan Valley was heavily settled with in-migrants. Forests were cleared, and illegal hunting of rhinos for their horn became widespread. Concerned about the decline of forest cover and of the rhinoceros, His Majesty's Government created a deer park in 1959, which was subsequently declared as the Royal Chitwan National Park in 1973 and extended to 932 sq. km in 1978. Chitwan was designated as a World Heritage Site in 1984.

Chitwan has supported a steadily growing tourist industry since 1974, and received some 55,000 visitors in 1992. The majority of visitors, perhaps around 80 per cent, were foreigners, many of whom stayed in lodges in or around Chitwan. These 65 lodges have created employment for around 650 people. The main attractions for tourists to Chitwan are tigers and leopards rather than Indian rhinos, but sightings of Indian rhinos are guaranteed for all visitors who go out on elephants. Tourists on elephant-back do cause some disturbance to rhinos feeding on open grass meadows. These visits last for some 10-40 minutes, and rhinos are alert, and may even walk away, depending on how close they are approached. Nevertheless, disturbed rhinos return very quickly to their previous pattern of activity once the elephants have departed. The overall patterns of disturbance to rhinos are considered slight because of their social system (which means that individual rhinos are not disturbed very often) and the current visitor levels (Lott and McCoy 1995). Furthermore, the disturbance to rhinos caused by tourists is probably less than that caused by other legal or illegal uses of Chitwan. For example, local people have been allowed to cut reeds and grass annually since 1976. There is also illegal use of Chitwan, primarily through cattle grazing and burning to improve the grazing, firewood collection, fishing, hunting of deer for meat, and hunting of tigers, leopards and rhinos for their valuable products (Nepal and Weber 1993).

Tourists to Chitwan can also canoe on the Rapti River. The behavioural responses of the ruddy shelduck to groups of canoeists were studied because of concerns that tour groups were causing significant disturbance to wildlife feeding behaviour. However, the results of the study indicated that the disturbance arising from the canoeists was insignificant, representing a total disturbance time of only 2.6 per cent of daily activity budgets (Hulbert 1990; HaySmith and Hunt 1995).

The use of Chitwan offsets some of the negative attitudes of local people to the park and its wildlife, which arises as a result of five main areas of conflict. First, crop-raiding was estimated to destroy 9 per cent of the total crop in Chitwan District, and 60 to 70 per cent of the crop in individual villages close to the borders of Chitwan, and Indian rhinos were among the chief culprits. Second, Indian rhinos have killed and injured local people. Third, tigers have preyed on livestock. Fourth, access has been denied to resources, following the recent establishment and enlargement of Chitwan. Fifth, the relationship between local people and the army that protects Chitwan is not good (Nepal and Weber 1993).

disturbance to wildlife occurs when tourist guides dig up turtle nests and chase swimming jaguars, tapirs and otters in to give clients better viewing opportunities (Box 3.1). On the Matusadona shores of Lake Kariba in Zimbabwe, the number of tourist boats and the noise generated has disrupted the feeding and drinking patterns of elephant and possibly black rhinoceros, and it is feared that further increases in boat traffic will affect the reproductive success of the hippopotamus (McIvor 1994).

For many tourists, observing a top predator stalking and securing a kill may be the highlight of a wildlife safari (Mathieson and Wall 1982, Newlands 1997). However, the desire to view such activities can affect certain predators, for example cheetahs (Box 4.2) and leopards (Box 4.5), in particular protected areas. For some species of top predator, data on disturbance is largely inferred and anecdotal, for example studies of leopards in Ruhuna National Park, Sri Lanka (Chambers *et al.* 1983). In the case of the more common, cryptic and generally nocturnal leopard, such disturbances are likely to be insignificant in terms of their overall range, but the diurnal cheetah is less common and widespread, and more prone to disturbance. Disturbances can also occur to other predators

Box 4.5: Effects of Tourism Development in the Luangwa Valley, Zambia

The 9050 sq. km South Luangwa National Park is the primary destination for wildlife-based tourism in Zambia. The main focus of tourist activity is around Mfuwe, lying some 20 km from an all-weather airport, and where the only bridge across the Luangwa River joins a network of all-weather game viewing tracks. The park now only has one functioning lodge (Mfuwe Lodge) and various less sophisticated bush camps. The last decade has seen a significant increase in tourist facilities around Mfuwe, outside the park in the adjacent Lupande Game Management Area (GMA). These consist of private tourist lodges, bush camps, hunting camps, camping sites and associated facilities such as dispensaries and shops.

Stated government policy is to promote high quality, low density tourism throughout Zambia. However, this policy is not being implemented in the Luangwa Valley. In practice, anyone is able to develop a lodge or camp in the GMA, with permission from the local chief, and without any effective screening or land use planning. Hence, the growth in tourist facilities around Mfuwe has been haphazard. One large plot at the park entrance, secured from the chief for an individual residence, is now being subdivided for private housing and other developments. Another plot secured from the chief to build a house has instead been used to construct a 30 bed tourist unit.

Over 15,000 game viewing tourists visited the park in 1995. Many of these visitors go on walking safaris and stay four to five nights. Night drives using spotlights and game drives in open vehicles are also offered. The main game-viewing areas of some 500 sq. km are particularly overcrowded in the peak month of August. This is most noticeable at night when tracks around Mfuwe are "saturated" with night drive vehicles using spotlights. Mfuwe is renowned for its leopards and several vehicles often converge on a kill. Tourist operators admit that leopards are no longer shy and some will approach vehicles. Leopards have also become habituated to spotlights, and take advantage of prey being dazzled. Operators have agreed a voluntary code of conduct that prohibits shining spotlights in animals' eyes and inducing hunting, but it is not fully effective. Tourists have also produced increasing litter in the park.

The growth of tourism and associated jobs has witnessed a large increase in the human population around Mfuwe. Census statistics show that Lupande GMA had 28,000 residents in 1988 and 36,700 in 1995/6. Some of the 4 per cent annual increase has been due to a high birth rate amongst the dominantly young population, but there has also been considerable immigration to the Mfuwe area in search of work. Mfuwe is the only area within Luangwa Valley with any significant development (based on wildlife) and where people see possibilities to earn money. Every paid job or entrepreneurial activity carries 10-15 associated people in the immediate and extended family.

A growing population has seen an increase in bush clearing for gardens and tree-felling (for poles, timber, fuelwood and, more recently, charcoal production for sale and export from the Valley). As many as 100 large trees were noted to have been cleared in one location over a two week period and stacked for transport out of the valley. The pressure on the land is such that not all families are able to have their own garden and grow their own food. Furthermore, developing gardens in this semi-arid area is risky, especially when the rains are unreliable and elephants often damage crops. Hence, there has been a large increase in the snaring of wild animals (particularly impala) 'for the pot', to sell for cash or to exchange for maize or other essential commodities. However, snaring is indiscriminate, and a recent survey in nearby Malama recorded a total of 156 snares with a linear density of 3.1 snares per km. One was found with an impala, another with a kudu. Other reported snared animals included two lions, a young elephant, and a hyena. The survey report suggests a mean of 72.5 snares owned per village.

The number of fishing camps on the Luangwa River has also grown. Tourist operators complain that many camps are disruptive, being sited at traditional elephant crossing points. Hence, elephants either now do not cross out the park or only cross late at night, channelled into particular areas of concentration and causing extensive local damage to crops and property.

Sources: Personal communications (Phil Berry, Mike Bailey and the late Norman Carr) and Lewis and Phiri (undated).

where tourist vehicles ignore access restrictions and drive off tracks in pursuit of animals, for example in Tanzania's Ngorongoro Crater. Even where disturbances are demonstrated anecdotally or quantitatively, it is even more difficult to demonstrate any impact on population dynamics.

Normal feeding patterns may also be disturbed by artificial feeding. This can arise as a result of park staff attempting to create a spectacle for tourists, or as a result of tourists offering food to animals in an attempt to encourage them to come closer. A case of the former occurred in Komodo National Park, where Komodo dragons were artificially provisioned with goats at a viewing site to guarantee tourists a sighting of dragons. However, provisioning of dragons has now ended, in an attempt to create a more natural situation for tourists (Box 4.6). Similarly, tigers have been baited at Tiger Tops in Chitwan National Park for many years to guarantee a spectacle, but a study of the effect of baiting was based purely on anecdotal evidence and surmise (McDougal 1980).

Box 4.6: Dragon Tourism in Komodo National Park, Indonesia

Komodo National Park was declared in 1980 to conserve the world's largest lizard, the Komodo dragon. The park encompasses the whole of Komodo, Rinca and Padar islands, and a marine reserve in the Lesser Sunda Islands. The park encompasses much of the known range of the Komodo dragon and covers some 407 sq. km of land area and a marine area of 1325 sq. km. Some seven species of mammal, including the rusa deer and some 72 species of bird also occur in the park. The area became a Biosphere Reserve in 1977 and a World Heritage Site in 1992. Fishing villages still remain in the park.

An increasing number of visitors come to the park, almost 30,000 in 1995/96. The park entrance fee is low and charged on a one-off basis regardless of length of stay. Visitors come by several routes. Some 50 per cent of visitors arrive on luxury cruise ships that also visit Bali, and these high-paying tourists only spend part of a day in the park. Another 10 per cent of visitors arrive on package charter tours. In contrast, some 40 per cent of visitors are independent travellers who spend time in the gateway town of Labuan Bajo on Flores island, and many also spend 1-2 days visiting the park. Hence, local people derive more benefits from sale of accommodation, guiding and curios to independent travellers than they do the cruise ship and package charter visitors.

Visitors to Komodo walk along a 2 km trail to a viewing site that is fenced in for visitor safety. The Komodo dragons used to be provisioned with dead goats at the viewing site every few days to ensure that visitors experienced a dragon involved in a spectacle. Provisioning was stopped by the end of 1994, since when the number of dragons seen at the viewing site has declined. But a more natural viewing experience now occurs, and tourism now has little direct impact on dragons. The indirect impact of tourism on the terrestrial environment is also small, given its restricted geographic extent. Greater concerns are voiced about the impact of anchors, trampling and pollution on the marine life of the park. Hence, regulations against development and over fishing have been developed in order to maintain tourist interest and achieve conservation objectives. A further concern is that high paying tourists are contributing very little to conservation or to local communities.

Source: Goodwin *et al.* (1997).

Feeding of wildlife by tourists can have severe consequences for social behaviour patterns. Artificial feeding by tourists caused a breakdown of the territorial breeding system of land iguanas on South Plaza, in the Galapagos Islands. Territories were abandoned in favour of sites where food could be begged from tourists, and this had a negative effect on the breeding success of iguanas (Edington and Edington 1986). Artificial feeding can also result in a complete loss of normal feeding behaviour. In the Galapagos Islands, overfeeding by tourists was so extreme that, when stopped, some animals were unable to locate their natural food sources (Boo 1990). Similarly, until the early 1970s, the diet of some grizzly bears in Yellowstone National Park in the USA consisted, to a large extent, of food wastes left by visitors at park refuse sites. When these sites were closed, the bears showed significant decreases in body size, reproductive rate and litter size (Knight and Temple 1995).

A film on baboons documented their behaviour around wildlife lodge rubbish dumps in Kenya. Intense competition between the baboons and other dump scavengers such as warthogs, marabou storks and guinea fowl, led to stress and aggression, and changes in baboon behaviour. Baboons lost their fear of fire and were often seen rummaging in dump fires. The dumps offered easy access to a rich diet and resulted in the baboons spending less time searching for food and more time at leisure and play. Youngsters had novel toys such as cans, plastic bags and broken mirrors (Tyack 1996).

Artificial feeding can also affect tourists directly through injuries, and damage to vehicles and camp sites, that in turn leads to the destruction of individuals. Bold species like baboons quickly become accustomed to obtaining food from tourists and may become aggressive in order to obtain more. Baboons along roadsides have become habituated to humans, and wait to beg food from passing vehicles. Such potentially dangerous situations obviously cause serious management problems for park guides and rangers. Baboons that are noticed begging from visitors are automatically shot (after the visitors have left) to prevent the problem escalating in the Umfolozi Game Réserve in South Africa (Paul Cryer 1995, pers comm). Similarly, a bull elephant was shot because it turned cars over to search for oranges in Mana Pools National Park in Zimbabwe (cited in Melvor 1994). Attacks on tourists by crocodiles, hippopotamus and buffalo along the Zambezi River are due to increased familiarity with humans and/or irritation due to their presence (Melvor 1994).

4.2.2 Disruption of parent-offspring bonds

Wildlife tourism can also cause disruption to intra-specific relationships. Attendance by female harp seals to their pups declined when tourists were present in Canada's Gulf of St Lawrence, and those females remaining with their pups spent significantly less time nursing and more time watching the tourists (HaySmith and Hunt 1995). In East Africa, tourist vehicles can separate young ungulates from parents. If separation is prolonged, it can interfere with mutual recognition bonds, the young can be rejected by parents, and there is also a risk of young animals being attacked by predators (Edington and Edington 1986). A similar concern has been expressed over whale watching. Whale calves normally maintain constant body contact with their mothers but, when separated, can transfer their attachment to the side of a boat (Edington and Edington 1986).

4.2.3 Increased vulnerability to predators and competitors

The viewing of certain species by wildlife tourists can make that species more vulnerable to predators. Evidence of this phenomenon has been recorded in birds, reptiles and mammals.

Tourists visiting breeding colonies of king shags and Magellan penguins in Patagonia increase numbers of eggs lost to predatory gulls. Adult birds at the edge of the colony tend to move away as tourists approach, leaving the nests open to attack (Edington and Edington 1986). Similar problems occur in breeding colonies of brown pelicans visited by tourists in Mexico. Breeding success decreased by 52-100 per cent in visited sites compared to unvisited sites (Anderson and Keith 1980).

Nile crocodiles were a major tourist attraction in the Murchison Falls National Park, Uganda, during the 1960s. The approach of tourist boats to river bank breeding sites caused the female crocodiles to retreat into the water, leaving the young and eggs in their nests and open to attack from monitor lizards and baboons. The number of nests predated ranged from 54 to 100 per cent amongst visited sites, compared to 0 to 47 per cent amongst undisturbed sites (Edington and Edington 1986).

In the South Luangwa National Park, Zambia, tour operators undertake night drives using white spotlights, particularly to see leopards hunting. This has been noted to assist predators and to disturb predator-prey relationships. Spotlights fitted with red filters would not have this effect to the same extent since the glare and overall illumination would be reduced (Box 4.5).

The impact of visitors on relationships between competing species may sometimes be less obvious. Human traffic caused barking deer, sambar and Sumatran rhino to move away from visited areas, and tigers and sun bears to alter their daily activity patterns in Gunung Leuser National Park, Indonesia. On the other hand, most primates, some squirrels and hornbills gradually became habituated to the presence of visitors and their populations increased in visited areas (Box 4.7). Habituation can make wildlife more vulnerable to legal or illegal hunters. For example, in the Fishing Branch River Ecological Reserve in the Yukon, Canada, grizzly bears have become increasingly habituated to researchers. Therefore, bears are less fearful of hunters and more vulnerable when they move out of the reserve (Bob Weir, pers comm).

4.2.4 Transmission of diseases

A serious, but often overlooked problem of wildlife tourists is that they may unwittingly pass on diseases to wildlife. Disease transmission may be either direct, usually to species of large apes that are among man's closest relatives, or indirect through contact with some product used by man.

Direct transmission of disease is a long-standing concern for mountain gorillas, which are highly susceptible to human viruses and bacteria. These include tuberculosis, measles and pneumonia, all of which could potentially wipe out an entire population of this highly endangered animal (Kalina and Butynski 1995). The problem is exacerbated when there is very close contact between the gorillas and tourists, including occasional physical contact, despite regulations that the distance between gorillas and tourists should never be less than five metres.

Concern has also been expressed about the introduction of diseases to Antarctica as a result of human activities, including tourism. Of specific concern is the introduction of Newcastle Disease, which is spread through infected poultry products. This could have devastating effects for the bird populations of the Antarctic (Marsh 1991).

4.2.5 Death of Individual Animals

Tourist vehicles may also kill wildlife accidentally. Tourist traffic in a German national park resulted in heavy losses to a number of species, particularly hares, roe deer and red deer (Mathieson and Wall 1982). Night driving vehicles may also kill wildlife, for example the frequent killing of scrub hares that feed on the short grasses at the road edges in South Africa's Kruger National Park (Edington and Edington 1986). Carrion feeders may benefit from an increase in food due to such deaths, but some scavengers feeding on road casualties may later become victims.

The most obvious direct impact arising from hunting tourism is the death of individual animals. However, when strict regulations and controls are applied to trophy hunting, the levels of off-take should be sustainable and ensure that there is no significant long-term impact on the wildlife population as a whole. As with impacts arising from game viewing tourism, there is very little evidence documenting that tourist hunters killing individual animals has any direct long-term importance at the population level.

Box 4.7: Controlled Human Disturbance in Gunung Leuser National Park, Indonesia

Gunung Leuser is one of the older and larger protected areas in Sumatra, and consists of eight adjoining areas of game reserve, recreation park and forest protection area. The oldest wildlife reserve was gazetted in 1934, the last was added in 1976, and the whole area was declared a National Park in 1980, and a Biosphere Reserve in 1981. Gunung Leuser has an area of 10,950 sq. km, and mostly lies on two parallel mountain ranges separated by the heavily populated Alas Valley that extends well into the park.

Visitors to Gunung Leuser mainly wish to see the mountains, hike and visit the orang-utan rehabilitation centre. With around 18,000 foreign visitors and 54,000 Indonesians in 1993, Gunung Leuser receives a larger number of visitors compared with many other Indonesian National Parks. However, the level of visitation is low relative to the size of the area.

Nevertheless, an interesting and controlled study using the passage of researchers showed that human traffic could disturb rain forest wildlife. The technique of "camera trapping" was used to compare a heavily travelled site (up to ten researchers during daylight hours) and a pristine site with similar vegetation and topography. The study suggested that some species avoided the heavily travelled area while at least one has become nocturnal. Larger species, such as barking deer, sambar and Sumatran rhino tend to move out of areas with much human traffic while tigers and sun bears seemed to have changed their activity periods. Most primates, some squirrels and hornbills gradually became habituated to humans.

Although these findings relate to human disturbance by researchers, they are relevant to tourism conducted under similar conditions. Hence, researchers operate in small groups, in relatively undisturbed sites and may deliberately habituate animals. Ecotourism can also result in habituated animals, potentially to the detriment of their competitors. It is not clear what intensity of use causes these changes but findings would indicate that tourist traffic should be zoned to designated areas with refuges remaining off limits.

Taken in isolation, this observation appears sensible. Equally, considered in a wider context, it is necessary to determine if refuges will be adequately protected, and if not whether tourism could add to their protection. In other words, some presence, and consequent disturbance, from tourists may be a good trade off for illegal activity such as killing Sumatran rhinos in traps.

Source: Griffiths and Van Schaik (1993).

Table 4.1: Some Indirect Tourist Impacts on Wildlife Habitat

Habitat Element	Impact
Soil	Loss of surface organic horizons Reduced soil porosity Altered soil chemistry Altered soil moisture and temperature Altered soil microbia
Vegetation	Reduced plant density/cover Altered species composition Altered vertical structure Altered spatial pattern Altered individual plant characteristics
Aquatic System	Altered bank/shoreline characteristics Altered bed/bottom characteristics Altered flow regimes Increased sedimentation/turbidity Altered organic matter content Altered water chemistry

Source: Cole and Landres (1995).

Box 4.8: Habitat Disturbance in Perinet Nature Reserve, Madagascar

The first nature reserves in Madagascar were established in 1927. There are currently six National Parks, 11 Strict Nature Reserves and 23 Special Reserves under the auspices of the Ministère des Eaux et Forêts (MEF). Strict Nature Reserves are only accessible to MEF staff and researchers while the others may be visited by tourists on purchase of a permit.

Perinet, or the Reserve Spéciale d'Analamazotra, is the most visited nature reserve on the island. It covers an area of 8.1 sq. km. and was initially created to protect the largest endemic primate, the indri. The indri, and other easily observed primates, are the main tourist attraction. Tourism is currently in its formative years and approximately 3,900 tourists visited the reserve in 1990. However, numbers of tourists are expected to increase.

Habitat disturbance has occurred at sites where tourists congregate to watch lemurs. Many tourists leave the designated paths in order to get better views, take better photos and this trampling in time creates additional trails. This may produce micro habitats unsuitable for small endemic mammal species but favourable to more competitive introduced species such as the black rat. Similarly, the disturbance may offer access to exotic flora. Disturbance may also cause a reduction and species range and at extremes cause local extinction.

There is also some direct disturbance of wildlife. A few indri are habituated to humans and easily approached by tourists. Guides actively search for these individuals on a daily basis to maximise the tourist experience. In addition, several species of small mammals and reptiles are regularly caught to show to tourists. The effect on their behaviour is unclear, and further research is recommended, particularly in view of rapid tourist expansion and the associated disturbance.

The environmental impact of tourists at Perinet is currently very localised. However, there is likely to be increased littering, and path erosion as numbers of tourists increase over time. These may compound existing problems of habitat and wildlife disturbance.

Source: Stephenson (1993).

Box 4.9: The Effects of Scrub Clearance in Thornybush Game Reserve, South Africa

In Thornybush Game Reserve, South Africa, a scrub clearance programme was designed in order to improve wildlife viewing opportunities for tourists. An environmental impact assessment (EIA) of the programme concluded that the scrub thinning would impact differently on different species, tending to favour grazers (e.g. buffalo) above browsers (e.g. giraffe), and those which prefer open spaces (e.g. zebra) above those which rely on dense cover to evade predators (e.g. kudu). Impacts are likely to be greatest on small mammals and birds which rely on scrub cover for breeding and nesting sites.

The EIA also found that further habitat modification could be induced by the programme. For example, soil erosion was likely to occur as a result of the removal of woody plants and through ground disturbance. Impacts on soil hydrology were, however, likely to be beneficial - as the resultant increase in grass cover would be expected to increase infiltration of rainfall into the soil and reduce runoff. The programme might have longer-term impacts on hydrology and soil erosion, as a consequence of reduced vegetation cover.

Source: Monchel Ltd (1994).

4.3 Indirect Impacts

Wildlife tourism can result in a number of indirect impacts upon wildlife habitats. Table 4.1 provides a simple analysis of how tourist impacts influence important habitat characteristics, which in turn affect the quality and quantity of the food and living space available to wildlife. The fortunes of wildlife populations may be affected by tourists due to localised changes in habitat from trampling and littering. Litter is a significant problem (Boxes 3.4 and 3.5). Turtles in the Galapagos Islands sometimes swallow plastic bags, mistaking them for jellyfish, and may subsequently die (Boo 1990). Habitat alteration also occurs at sites where tourists congregate. In Perinet Nature Reserve, Madagascar, tourists congregate to watch lemurs, and this has produced micro habitats unsuitable for small endemic mammals, but favourable to more competitive introduced species such as the black rat (Box 4.8). In Kakadu National Park, Northern Australia, research suggests that tourist vehicles may inadvertently contribute to weed infestations by transporting seeds into the park (Lonsdale and Lane 1994).

Habitat change may sometimes be brought about deliberately in order to maximise wildlife viewing potential (Box 4.9). In Zimbabwe, vegetation was burned early in the season along tourist roads in order to attract wildlife to the roadsides (Attwell 1971). This can alter the feeding habits of wildlife, can lead to long-term habitat degradation and to changes in plant succession in some vegetation types, that in turn results in bush encroachment. On a larger scale, South Africa's Kruger National Park has a management policy that aims to retain the habitat in a state that is neither too closed for tourist viewing, nor too utilised by elephants (Box 3.3).

In some cases, habitat damage caused by trampling is short-lived, particularly where there are seasonal patterns of visitation and regrowth. Hence, in Manu National Park, Peru, trampled vegetation has been noted to recover rapidly along tourist trails, with spectacular regrowth during the rainy season, when fewer tourists visit the areas (Box 3.1). On the other hand, a section of Kenya's Masai Mara Game Reserve was closed to tourist vehicles during the late 1980s when it was badly damaged by tourist minibus use. The Masai Mara Ecological Monitoring Unit found that the area did not recover from the damage over a six month period, and recommendations were made that the section should remain closed for a further 6 to 12 months (Adams and McShane 1992). However, research in the late 1980s found that the *permanent* ecological damage caused by off-road driving was negligible (Box 4.10). While vegetation recovered very little in the dry season, regrowth was rapid in the wet season (Muthee 1992).

Box 4.10: Off-Road Driving by Tourists in Kenyan Parks

Off-road driving by tourists is common in the Masai Mara and is often perceived as a severe ecological problem. Vehicles can cause damage to vegetation, cause soil compaction and erosion, alter the species composition and influence the recovery of grass species (Muthee 1992). Around 24,000 vehicles enter Masai Mara annually for an average of 2.5 days each. A study in the 1980s found that there were conspicuous secondary tracks over extensive areas totalling 15.3 per cent of the reserve's area, and increased vehicle densities and speeds correlated with greater loss of vegetation cover and increased soil compaction on grasslands. However, the permanent ecological impact on the grasslands was negligible. When vehicles were excluded in experimental plots, the recovery of the grass species affected by vehicle tyres was rapid and almost complete after three months (Onyeanusi 1986). In a similar study in Amboseli National Park, Kenya, the maximum loss of standing crop attributable to off-road driving was only 0.6 per cent per annum. It is not so much the ecological impact of off-road driving that is a problem, but rather the negative aesthetic impact of numerous secondary tracks that may impose on the visitor experience and enjoyment (Onyeanusi 1986).

Another element of tourism that has great potential to produce negative effects is an increasing market for tourist souvenirs and curios (Mathieson and Wall 1982). In some cases, these souvenirs may be local artefacts, and tourists may contribute significantly to the economics of local communities through buying locally produced crafts and produce. However, the growing demand for wildlife souvenirs has also resulted in an increase in the collection of wild plants, corals and shells as well as the illegal capture and killing of wild animals to supply the curio trade with furs, skins, stuffed animals, ivory, horn, teeth, ostrich eggs, and so on. For example, illegal hunting in protected areas has been stimulated by the high demand from tourists for animal skins in Bahia, Brazil (Leal Filho 1992), and in Manuel Antonio National Park, Costa Rica, tourism to view squirrel monkeys has stimulated the revival of the capture of monkeys for sale as pets (Wong and Carrillo 1996).

Box 4.11: Environmental Impacts in Yankari Game Reserve, Nigeria

The Yankari Game Reserve covers an area of 2244 sq. km in Bauchi State, Nigeria and is considered the most popular game reserve in the West African sub-region. It was established as a game reserve in 1953 and officially gazetted after independence. Since 1987 it has been managed by a publicly owned, limited liability company, the Yankari Game Reserve and Tourism Company Limited.

The reserve has been visited by tourists since 1962 with numbers rising steadily from around 500 to over 30,000 in the late eighties. Tourist facilities include one camp comprising over 100 furnished chalets with a camping ground nearby for tents and caravans. In addition there is a reception complex with conference facilities for 100, bars and a restaurant. Access to the reserve is by road, a 4.5 hour journey from the nearest airport.

A number of environmental impacts have been associated with the development of tourist facilities, including the following:

- **Water Pollution:** waste water from chalets, catering accommodation and other tourist installations is discharged into the groundwater regime from where it finds its way into the surface water.
- **Solid Waste:** solid waste collection and disposal are poorly managed and generally disposed of by open air incineration and uncontrolled dumping and composting. Tourists also leave litter both at the accommodation area and in the open.
- **Noise pollution:** noise from vehicles and tourists has caused some disturbance to behaviour patterns of wildlife particularly during mating and resting periods.
- **Soil Erosion and vegetation damage:** soil erosion and killing of vegetation is evident along the roads and around the buildings.

None of these impacts appear critical, because only a small part of the reserve is affected and numbers of visitors are relatively low. Nevertheless, there is need for better regulation of tourist facilities.

There have also been some positive effects arising from the development of tourism in Yankari. All visitors on game-viewing trips must be accompanied by guides. The reserve has helped to reduce poaching and conserve wildlife. Local farmers sell food to the restaurant and souvenirs to visitors.

Source: Olokesusi (1990).

4.4 Impacts from Associated Infrastructure

Wildlife tourism activities inevitably require some degree of supporting infrastructure and facilities. When uncontrolled and poorly regulated, such infrastructure can be unsightly and cause tangible

problems, for example to water quality and local health (Boxes 3.5, 4.5 and 4.11). Equally, some wildlife tourist operations have a positive policy to keep impacts from infrastructure to an absolute minimum, for example walking safari camps on communal land in Tanzania (Box 3.11). In another example, the Wilderness Leadership School in South Africa even goes to the extreme of burying or scattering the ashes of campfires, not re-using campsites until trampled vegetation has completely recovered, and returning unused firewood to the locations from where it was collected.

The level of services and facilities provided to different types of wildlife tourist varies immensely within the industry, from luxury hotels to tented camps and campfires. The major environmental impacts associated with general tourist infrastructure developments have already been reviewed in Chapter 2 (see section 2.3). This section briefly considers a number of essential services that are common to all scales of the wildlife tourism industry, from budget to luxury, that have the potential to cause significant impacts. These include road and trail systems, waste disposal mechanisms and energy and water supplies. Table 4.2 provides a summary of the environmental impacts of the main infrastructural developments associated with wildlife tourism (and other factors covered elsewhere in the report).

Tourist roads and trails can have a number of indirect impacts on wildlife (Giorgio *et al.* 1993). Road construction can cause habitat loss, and an increase in habitat edge (with associated edge effects). Roads can also represent barriers to wildlife. Tourist roads may be built up on embankments that are too steep for some animals to climb. For example, young animals may be left behind when a family group crosses an embanked road in Kruger National Park in South Africa, particularly if the group is disturbed and panics (Edington and Edington 1986). A secondary impact of roads is the effect of vehicle headlights. Turtle hatchlings have been observed to be severely disorientated by headlights, crawling inland instead of towards the sea and dying in large numbers (Edington and Edington 1986).

One of the major service problems of any tourist development is that of waste disposal. Dumping of refuse from tourist camps and hotels can attract scavengers. This may not only alter the natural feeding habits of these species, but may also represent a threat to the tourists. Large species may pose a direct physical threat to tourists, and have to be shot, while others may cause more indirect hazards. Thus, scavenging flocks of marabou storks around tourist sites in Africa may collide with light aircraft servicing such areas (Edington and Edington 1986).

Wildlife tourism developments can severely impact water supplies in an area. Of particular concern is the unregulated discharge of sewage which can have severe implications for the ecology of tourist areas, as well as for the health of both tourists and locals who use contaminated water for drinking, bathing and cooking (Hunter and Green 1995). When discharged into enclosed inland water bodies, sewage can result in excessive algal growths. Equally, sewage released into the sea may have implications for coral reefs if algae grow to such an extent as to cover large sections of the reef and prevent the corals from obtaining light and essential nutrients (Edington and Edington 1986). As well as contaminating freshwater supplies with sewage, wildlife tourism enterprises also inevitably result in increased demand for water. Many wildlife tourism destinations are in hot, dry climates. While local people may struggle to find sufficient water for themselves and their animals, visitors to luxury hotels and game lodges expect to have water on tap for daily baths and showers, and many of these luxury facilities include swimming pools and artificially watered lawns and gardens.

Energy supplies for wildlife tourism enterprises can vary from firewood, collected on a daily basis from inside or outside reserves, to mains electricity supplied through power lines which may often be provided specifically to serve an individual hotel or game lodge. Both extremes have associated impacts. The collection of firewood can result in habitat disturbance or degradation and vegetation loss, while power lines produce a visual, aesthetic impact in the

case of overhead lines, as well as impacts associated with vegetation loss where pylons are erected or cables buried.

Table 4.2: Potential Environmental Effects of Wildlife Tourism

Factor Involved	Environmental Effects
Tourist overcrowding	Environmental stress, animals show changes in behaviour.
Overdevelopment	Excessive manmade structures, unsightly urban-like development.
Recreational Activities: (a) Boating (b) Fishing/Hunting (c) Foot safaris	(a) Disturbance of wildlife, particularly interference with resting, breeding and feeding behaviour, noise pollution. (b) Some disturbance effects, competition with natural predators. (c) Disturbance of wildlife, vegetation damage and soil erosion around trails.
Pollution: (a) Noise (b) Litter (c) Vandalism	(a) Disturbance of natural sounds, wilderness peace. (b) Degradation of natural scene, dangers to wildlife, health hazards to tourists. (c) Mutilation of natural attractions, theft of plants for private gardens.
Artificial Provisioning: (a) Feeding by tourists (b) Provision of water holes and salt licks	(a) Behavioural changes, decrease in self-reliance, danger to tourists. (b) Unnatural concentrations of wildlife, excessive vegetation damage in vicinity.
Vehicles (speeding, night driving, off road driving)	Wildlife mortality, soil and vegetation damage, disturbance of wildlife, air pollution.
Infrastructure: (a) Roads (b) Power lines (c) Waste disposal (d) Firewood provision	(a) Disturbance to wildlife, barrier effects, habitat loss, aesthetic effects. (b) Vegetation loss, aesthetic impacts. (c) Problem animals, health hazards, decrease in water quality. (d) Habitat disturbance, small wildlife mortality, interference with ecosystem energy flows.
Other: (a) Souvenir collection (b) Introduction of exotic plants and animals	(a) Removal of natural attractions, stimulation of illegal poaching, disruptions of natural processes. (b) Competition with indigenous species, alteration of natural environment atmosphere, public confusion.

Source: Adapted from Thorsell (1984).

4.5 Management of Impacts from Wildlife Tourism

The previous sections in this chapter have discussed studies of wildlife tourism where direct and indirect impacts may affect behaviour, reproductive success and mortality of particular species. An interesting point is how few quantitative studies there are of actual impacts or of their importance. This contrasts with a postal questionnaire survey of 319 protected area managers that suggested some 50 per cent of areas in developed countries had impact monitoring in place, compared with 35 per cent of areas in developing countries (Giongo *et al.* 1993). Furthermore, the survey also elicited that a proportion of managers had determined that the various impacts had exceeded acceptable levels (Table 4.3).

Therefore, one possibility is that the scale of monitoring of impacts may be more extensive than that suggested by our survey of literature, with the results of the ongoing impact monitoring being used in an adaptive management framework by managers without being recorded formally in the literature. Another possibility is that, because the results of a postal survey were not verified, much of the ongoing impact monitoring indicated in the responses was largely anecdotal and unverifiable, but recorded in questionnaires nonetheless.

The nature and magnitude of impact on wildlife will be influenced by many variables, including the type of activity, the ecology of the area, the characteristics of a particular species and differences between individuals within a species. These differences may be due to a variety of biological or ecological factors. While some effects of wildlife tourism will be obvious, others will be more difficult to identify and measure. Furthermore, the results described from studies of environmental

Table 4.3: Monitoring of Impacts in Protected Areas in both Developed and Developing Countries

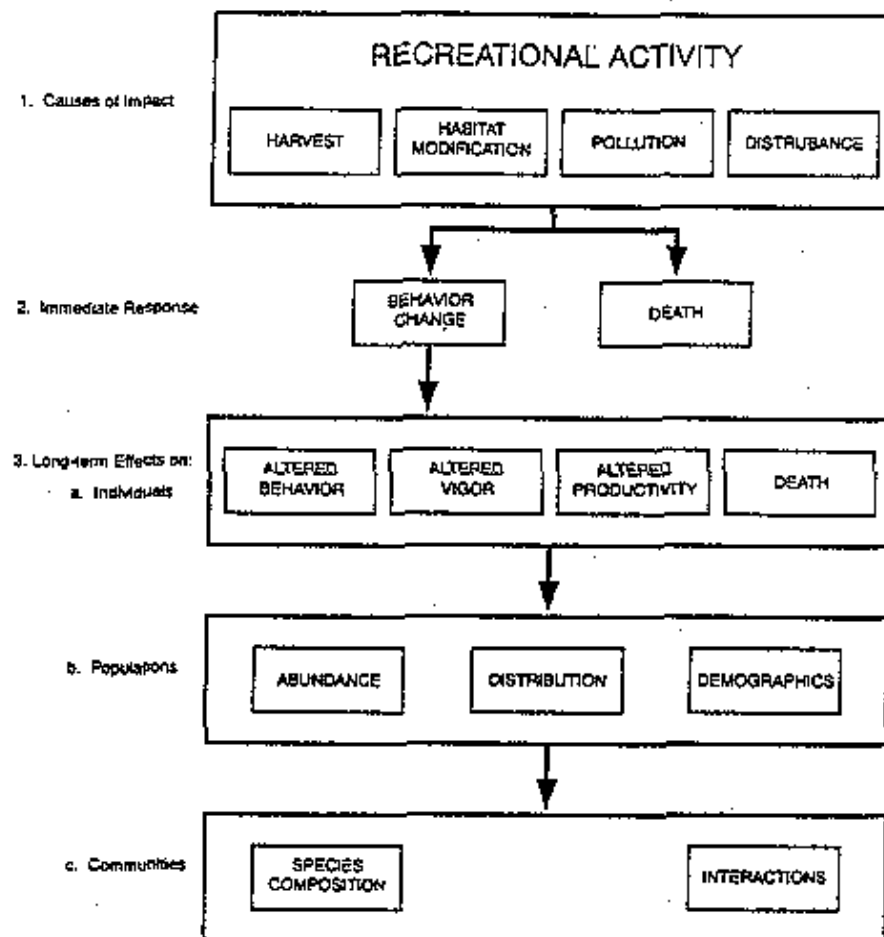
Biophysical Impact	Developed Countries		Developing Countries	
	Monitoring of Impacts (%)	Impacts exceeding acceptable levels (%)	Monitoring of Impacts (%)	Impacts exceeding acceptable levels (%)
Water quality	46	6	28	3
Wildlife	51	2	44	4
Trail depth	53	13	30	7
Site spreading	54	14	32	6
Vegetation	56	9	36	4
Erosion	66	16	41	8
Littering	60	7	45	8
Other	8	2	24	2

Source: Giongo *et al.* (1993).

impacts of wildlife tourism will vary according to the time scale over which they are carried out. Most studies have focused on short-term effects. An obvious constraint is the little research on the long-term effects of wildlife disturbance by tourists (Vaske *et al.* 1995). In addition, most studies of immediate responses to disturbance have focused on individuals or species rather than on populations or communities. Some of the likely interrelationships between short- and long-term effects, and effects on individuals, populations and communities are shown in Figure 4.3.

In summary, much uncertainty, and little quantitative information, exists about the type, scale and significance of the environmental impacts arising from wildlife tourism. Nevertheless, there is some acceptance that negative impacts will arise from tourism-induced change, and that these will follow an exponential relationship. In other words, a little use will cause much impact. Furthermore, once impacted, a resource often will take a long time to recover to its original state. Equally, the type, scale and significance of the environmental impacts of wildlife tourism will vary individually, depending upon the ability of a visited area and its focal species to sustain a given number of tourists and their various activities. In turn, this will be determined by the ecology of that area, and must be compared to the current volumes and activities of the tourists who visit. If one exceeds the other, there is likely to be a problem. Therefore, many park management plans or national tourism policies mention the need to control the impacts arising from tourist activities, despite little precise knowledge of impacts arising from wildlife tourism (Giorgio *et al.* 1993).

Figure 4.3: Effects of Tourists on Wildlife



Source: Knight and Cole (1995).

4.5.1 Concepts of carrying capacity and acceptable limits

The question still arises of how best to determine the levels at which the control of visitors is necessary. Several ideas exist for protected areas, including those of defining carrying capacity, and of acceptable limits of change and use (reviewed in Giongo *et al.* 1993). However, little thought has been devoted to how best to determine the levels at which the control of visitors is necessary to accommodate the views, aspirations or needs of indigenous or local communities outside protected areas. Within protected areas, the idea of carrying capacity as applied to tourist management considers the maximum use an area can sustain. Hence, the idea of tourist carrying capacity assumes that there is a level of development, and a maximum number of visitors, that a protected area can tolerate without adverse effects on the environment. All natural areas are considered to have limited ecological, physical and aesthetic carrying capacities, which may be defined as follows:

- the ecological carrying capacity is reached when the number of visitors and characteristics of visitor use start to affect the wildlife and degrade the ecosystem;
- the physical carrying capacity is reached when all available facilities or infrastructure are saturated;
- the aesthetic (or social) carrying capacity is reached when the number of visitors reaches a level where tourists frequently encounter other tourists, or see their impacts, such as litter, and lack of wildlife, so that their enjoyment of the site is diminished.

Furthermore, if this system were to be adapted for use with local communities surrounding protected areas, an important consideration would be to determine their views on the social, aesthetic and cultural aspects of tourist carrying capacity.

A number of factors need to be considered in determining the various carrying capacities of an area. These include: the size of the area and the amount of usable space within it; the fragility of the environment; numbers, diversity and distribution of wildlife; topography and vegetation; sensitivity of wildlife to human visitors; tourists' viewing choices; visitors' perceptions and behaviour; and availability of facilities (WTO and UNEP 1992).

Despite the recognition of the importance of the concept, there have been no comprehensive scientific studies of a destination's capacity to support wildlife tourism (Zanre 1995), and carrying capacities have been defined for very few protected areas in either developed or developing countries. Even where they have been defined, strategies have not been established for remaining within the limits of carrying capacity, with the possible exception of the physical carrying capacity. This may be due to broader management and local area objectives. For example, exceeding the ecological carrying capacity might be tolerated if it generates sufficient extra income to satisfy local economic needs (Zanre 1995). The task is also exceedingly complicated because ecological carrying capacity varies from season to season, and year to year, depending on patterns of rainfall, wildlife migrations, and so on (Henry 1992). In addition, as mentioned already (Table 2.1), the level of environmental impact is often determined by the types of visitors present and their behaviour rather than the actual numbers of visitors. There appears to be no direct correlation between the number of visitors to a site and negative impacts on soil, vegetation, wildlife and other visitors. The degree of impact depends on many variables in addition to the amount of use, including (Wallace 1993):

- the degree of site hardening (making landings, trails or overlooks resistant to erosion);
- the motivations and behaviour of visitors;
- their mode of transport and accommodation;
- the effectiveness of guides;
- group size; and
- environmental variables such as soil type, slope, vegetation type and season.

A more widely used system is the Limits of Acceptable Change (LAC) (Stankey *et al.* 1985) and the Limits of Acceptable Use (LAU) (see Box 3.5). This system accepts that some change in nature is inevitable, and represents a framework within which acceptable types and levels of environmental and social impacts are defined by resource managers, which then allows the levels of use to be determined. The setting of LAC and LAU may encompass a range of social, economic, and political considerations, as well as ecological criteria in order to balance the potential gains and losses from imposing limitations on use. Hence, the LAC and LAU system places primary emphasis on the conditions, both physical and social, desired in the area rather than on the maximum amount of use the area can tolerate. The latter requires managers to define the desired conditions and to undertake actions to achieve and maintain those conditions. This idea must be based on achieving a clear idea of the desired conditions, and establishing a monitoring system that provides quantitative guidance that the desired conditions are not causing unacceptable impacts and resource damage (see Box 4.12).

Box 4.12: Steps in Determining Limits of Acceptable Change (LAC)

Step 1: Identify area issues and concerns, including legal guidelines, organisational policy, area-specific features and values, regional and national settings.

Step 2: Define opportunity classes, these representing sub-units of the area which provide different conditions, and increase the diversity of the area.

Step 3: Select quantitative indicators of resource and social conditions for which management is striving.

Step 4: Develop an inventory of existing resource and social conditions, using inventory data and maps.

Step 5: Specify standards for resource and social indicators for each opportunity class, based on inventory data to ensure realism and to clarify the nature and extent of management activity that will be required to achieve standards.

Step 6: Identify alternative opportunity class allocations reflecting area issues and concerns, and existing resource and social conditions.

Step 7: Identify management actions for each alternative, including an analysis of the various costs and benefits of each alternative, in terms of environmental impacts and impacts on visitors, as well as on administrative costs.

Step 8: Evaluate and select preferred alternative, the final selection reflecting the responsiveness of the alternative to the issues and concerns identified in step 1 and the management requirements identified in step 7.

Step 9: Implement actions and monitor conditions, with monitoring being particularly important as it provides feedback on the effectiveness of management actions employed, alerting managers to the need to consider more rigorous application of the use of other measures.

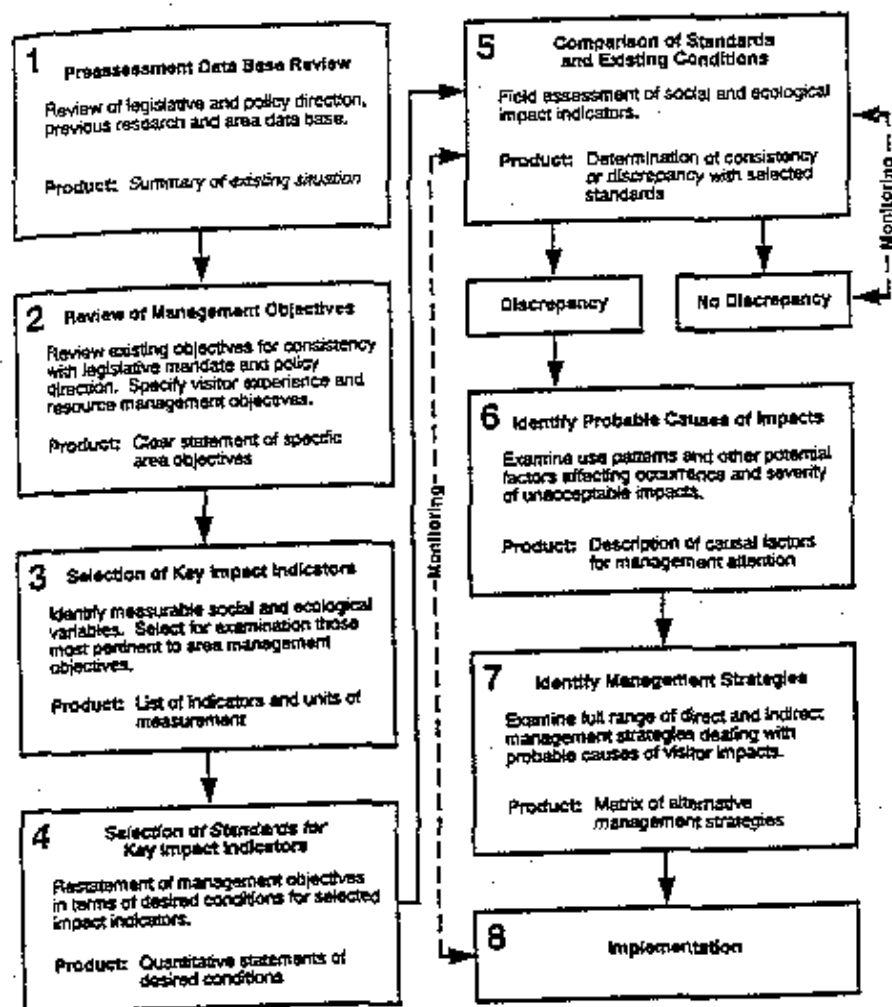
Source: Stankey *et al.* (1985).

Having defined the LAC, an obvious management strategy is to use LAUs to restrict visitor numbers in order to minimise environmental impacts. However, as already noted, carrying capacities and LACs have been defined for very few tourist sites, and therefore it is not often possible to calculate the optimal level of visitation. In addition, as previously mentioned, the relationship between level of

use and level of impacts is unclear. Establishing carrying capacities and use limits may, therefore, do little to solve impact problems.

In the United States, the National Parks and Conservation Association has developed a Visitor Impact Management (VIM) framework that is applicable across the US National Parks system. The VIM framework was derived from the literature on carrying capacity, but recognises the often obscure link between level of use and level of impact. The framework is an eight step sequential process that is designed to deal with three basic issues: the identification of unacceptable visitor impacts; the determination of potential causal factors affecting the occurrence and severity of the unacceptable impacts; and the selection of potential management strategies (Loomis and Graefe 1992). The process is summarised in Figure 4.4.

Figure 4.4: The NPCA's Visitor Impact Management Process



Source: Loomis and Graefe (1992).

Management strategies and techniques for the control or mitigation of tourist impacts include direct strategies that regulate or restrict activities, and indirect approaches that attempt to influence tourists behaviour (reviewed in Giongo *et al.* 1993). These are discussed below.

4.5.2 Direct controls

Limiting the total numbers of visitors to an area can control visitor impacts directly, particularly to avoid damage to fragile ecosystems or the disturbance of key species. In East Africa, for example, a number of gorilla tourism enterprises operate strict controls on visitor numbers (Table 4.4), and in Kibale Forest, Uganda, research into the response of chimpanzees to tourists recommends group sizes be kept to a maximum of ten (Johns 1996). However, explicit limitations of visitor numbers may not always be enforced. The management plan for the Galapagos Islands National Park set limits of 12,000 visitors per year, but numbers increased from 7,000 in 1975 to 32,595 in 1987 (Lindberg 1991).

Table 4.4: Gorilla Tourism in East Central Africa

Location	Daily Visitor Quota	Annual Quota
Parc National des Volcans, Rwanda	32	11,680
Bwindi Forest, Uganda	12	4,380
Virunga Mountains, Zaire	20	7,300
Kahuzi-Biega, Zaire	16	5,840

Source: Cited in Shackley (1995).

Another strategy is to disperse visitors to avoid concentration into small areas. However, much tourism-induced change such as vegetation loss occurs exponentially, so a little use may cause much impact. Hence, dispersing visitors to avoid overcrowding may actually result in greater overall or local impact. Similarly, allowing access to a new site may result in a rapid accumulation of damage at this site, whilst little or no recovery takes place at the old site. In other situations, there may be different impact-use relationships. For example, low density visitation appears to have a limited effect on the breeding or hunting success of large cats (otherwise it would not be possible to undertake field based research), while high density visitation can have dramatic consequences (Lindberg 1992). In this situation, visitor dispersal will reduce the impact of tourists on the large cats. However, such dispersal may simultaneously increase the impact on vegetation. Therefore, when attempting to manage tourists, it is necessary to identify key issues and set priorities. In this example, which is more important, the cats or the vegetation?

Zoning is an obvious method of reducing impact by restricting or preventing visitor access to certain areas either permanently, or at sensitive times of the year. For example, the primary management tool in the Great Barrier Reef Marine Park, Australia, is a system of zoning plans that partition areas into various uses and separate potentially conflicting uses. Zones include those which aim to preserve natural representative areas from virtually any human use, those which provide for recreation and tourism, and those which provide for general use including shipping and trawling (Woodley 1992). Similarly, Pilanesberg National Park in South Africa is zoned into areas for wilderness trails and for controlled hunting (and neither of these zones has any form of infrastructure development whatsoever); a general visitor zone used primarily for vehicle-borne viewing, with development including roads, hides and picnic sites; a multiple use zone, where any of vehicle-borne game

viewing, controlled hunting or activity trails can take place; and a peripheral development zone, where all visitors and staff are accommodated (Anderson 1983). Furthermore, all Biosphere Reserves are managed in theory through a zoning system where the central core area is out of bounds to tourists (Batisse 1986).

Areas that are closed to tourists may be chosen because of the particular ecological sensitivity of an area, with tourism concentrated in sites that can sustain higher visitation levels; or because of the particular importance of an area. For example, such an area might provide critical feeding or breeding habitat to certain species. Thus, in Monteverde Cloud Forest Preserve in Costa Rica, trails are temporarily closed to avoid disturbing nesting quetzals (Box 3.8). Zones may therefore include areas that require a complete ban on tourist use; areas that permit limited use, in terms of actual visitor numbers, timing during the day or season, tourist activities, and modes of transport; and areas where tourist use is unrestricted (within reason).

Tourists may be confined to fixed viewing points, both to control the activities of tourists, and to ensure good views of wildlife (Box 4.6). This often entails some modification of the area in order to make it attractive to animals, such as the provision of artificial water holes or salt licks. However, this can result in artificial concentrations of animals, habituation and subsequent vegetation damage. For example, the major ecological (and economic) problems in Hwange National Park, Zimbabwe are related to the provision of artificial water holes. The artificial water supplies are necessary to maintain the unnaturally high numbers of wild animals demanded by the wildlife tourist industry. Equally, it is only the revenue from this industry that can save the park from ecological disaster (Potts *et al.* 1996). At Treetops Lodge, in Aberdare National Park, Kenya, large quantities of salt are dumped just below the lodge windows, to lure animals into view. However, the salt leaches into the surrounding soil and has caused the vegetation around the nearby waterhole to die off (Shackley 1996). In any management decision, these negative impacts need to be balanced against the benefits of tourist control, with the added bonus of providing a quality wildlife viewing experience.

Fixed viewing points may be a useful management tool for species that can be attracted to particular areas, and in a habitat with natural barriers to movement. However, fixed viewing points do not solve the problem of minimising disturbance by mobile tourists in open habitats, or allowing tourists to view mobile wildlife. Guidelines for minimum viewing distances could, in theory, reduce the problem of tourist minibuses pursuing certain species like cheetah, but are very difficult to enforce. However, this technique has worked quite successfully with whale watching. Hence, the United States Marine Fisheries Service has drawn up guidelines for watching grey whales off the California coast that specify that vessels should not approach whales closer than 100 yards (Edington and Edington 1986). A well-designed trail system also provides tourists with the opportunity to explore a wide area while controlling where they can and can not go. Trail systems do require careful design, not just in terms of enabling tourists to see what they want to see, but they must also be routed in areas resistant to erosion and spreading (Wallace 1993).

4.5.3 Indirect strategies

Indirect strategies for managing tourist impact are those that aim to modify the behaviour of visitors. One of the most important ways to achieve this is to educate visitors about the potential disturbance they can cause and to provide advice on how to reduce it. Tourist groups accompanied by a guide, confined to specific locations and transported in large numbers provides the ideal opportunity to target information and to provide quality educational and interpretative experiences. As well as helping to reduce visitor impacts by advising tourists how to behave (e.g. detailed guidelines are provided to all tourists visiting Antarctica: see Box 4.13), education and interpretation programmes increase public awareness about the areas they are visiting and help to foster concern for

conservation. Methods of communicating with the public may range from visitor information centres, to specialised guides, to informal contact with park staff. In the Masai Mara, it became clear that drivers were a major source of information for tourists and yet often had no detailed knowledge about the park. A programme was devised to educate drivers so that they could provide information to tourists about the park as a whole, rather than just the most popular species, and therefore encourage tourists to visit different areas of the park, hence alleviating congestion (Gakahu 1992).

Box 4.13: Wildlife Tourism and Guidance for Visitors to the Antarctic

Antarctica has become a popular destination for wildlife tourists in the 1990s, with numbers of visitors increasing from 3,500 at the end of the 1980s to around 7,000 during 1992-3 (Stonehouse 1994). These visits extend from mid-November to late March, corresponding with good weather and ice conditions and spectacular wildlife (most notably penguins, seals and whales). More than 95 per cent of Antarctic tourists are ship-borne and therefore restricted to the readily accessible parts of the coast, more visiting the South American sector than any other area. However, cruise travel in the Antarctic summer coincides with the peak breeding season for many species (Shackley 1996) and environmental impacts include oil spills, disturbance to wildlife, potential introduction of disease, and pressure on regularly visited areas (Hall 1992).

Because of the increasing numbers of visitors to this relatively pristine and sometimes fragile environment, the following is being offered as guidance to visitors:

- Avoid disturbing wildlife. In particular, do not: walk on vegetation; touch or handle birds or seals; startle or chase any bird from its nest; wander indiscriminately through penguin or other bird colonies.
- Litter of all types must be kept to a minimum. Retain all litter (film wrappers, tissue, food scraps, tins, lotion, bottles, and so on) in a bag or pocket to be disposed of on board your ship. Avoid throwing tin cans and other trash off the ship near land.
- Do not use sporting guns.
- Do not introduce plants or animals into the Antarctic.
- Do not collect eggs or fossils.
- Do not enter any of the Specially Protected Areas and avoid Sites of Special Scientific Interest.
- In the vicinity of scientific stations, avoid interference with scientific work and do not enter unoccupied buildings or refuges except in an emergency.
- Do not paint names or graffiti on rocks or buildings.
- Take care of Antarctic historic monuments.
- When ashore, keep together with your party.

Source: Marsh (1991).

In any given situation, the management tools required to reduce the impacts arising from tourism may be any of the above, or a combination of all of them. In the Northwest Territories of Canada, a number of Inuvialuit Communities have produced local conservation plans. Most of these plans include tourism guidelines that incorporate a number of visitor management strategies: minimum heights at which aircraft can fly over nesting birds; minimum distances that tourists must keep from wolf dens and bird nests; and limits to numbers of tourists to certain areas at certain times of the year (e.g. breeding areas). In Gunung Gede Pangrango National Park, in West Java, the park's management committee has implemented a number of measures to reduce the impact of tourists including (Supriadi and Darusman 1992):

- limiting the number of tourists who can enter the park at any one time;
- closing the park for certain periods of the year;
- developing an environmental education programme; and
- developing a guided tour system.

Each situation is different and effective management will require a careful balancing of all potential gains and losses in order to determine optimal levels and types of tourist use, including: visitor satisfaction; conservation priorities; social, economic and political considerations; and ecological criteria.

CHAPTER FIVE

LESSONS LEARNED AND A FRAMEWORK FOR FURTHER RESEARCH

This overview study has shown that the environmental impacts arising from wildlife tourism are well appreciated, but poorly understood. The literature available and surveyed shows little quantitative basis on which to make generalisations about the environmental impacts associated with the various forms of wildlife tourism. At present, much of the literature relating to environmental impacts of wildlife tourism is descriptive or anecdotal with little hard data or scientific analysis. Only a few case studies were identified that actually document the environmental impacts of wildlife tourism. Most studies have focused on the short-term effects of disturbance by tourists, and on individuals or species rather than on communities or populations. The impacts recorded are various, some being associated with the tourism industry generally (Chapter 2), while others are associated with wildlife tourism in specific areas (Chapter 4). Greater emphasis has been placed on the economics of wildlife tourism developments, and numerous studies consider the potential of developing wildlife tourism or ecotourism initiatives in a particular area. Very few studies have taken a retrospective look at the environmental impacts that have occurred as a result of any wildlife tourism.

In order to develop effective policies and plans for wildlife tourism, a greater understanding is required of both its direct and indirect effects. Organised monitoring is required to further investigate the relationships between short- and long-term impacts, and to determine their biological importance. Such monitoring may be occurring in many protected areas (Giongo *et al.* 1993) but not reaching the literature (Chapter 4). When properly undertaken, such monitoring should be set in the context of an overall monitoring programme that examines all forms of impact as they affect wildlife populations, for example from illegal use, from habitat loss, from other forms of management, and so on (see for example Bell 1986). If a quantitative and comparative data set is to be gathered that would allow a rigorous analysis, this must be achieved in the context of a standardised framework.

Such a framework has been suggested specifically for examining the impacts associated with wildlife tourism in Figure 5.1. The framework is a working model that is based upon experiences gathered in this literature survey, and that may hopefully help those who commissioned this study, and others in a similar position, to establish the necessary monitoring frameworks for projects they establish that promote wildlife tourism. The framework comprises of a series of boxes that successively drive, and in turn feed back into, the system. Each box is accompanied by a table or part table (Table 5.1 to 5.5), outlining factors that appear important in driving the system, and on which quantitative and comparative data are necessary if a general framework of tourist impacts is to be determined in future.

The framework recognises that the system is driven by the type of tourist product that is marketed for each area (see Chapter 2; Table 5.2). This in turn is determined by a range of factors relating to the wildlife and scenic possibilities, and issues of access, seasonality and infrastructure (Table 5.1). The type of tourist product marketed determines the institutional regime under which tourism in individual areas is managed (Table 5.3). This in turn will determine some of the environmental, economic, social impacts of that tourism (Table 5.4). This further determines the political impact of that tourism, and the policy regime under which it is managed (Table 5.5). These factors in turn feed back into and drive the system, particularly the economic, social and political impacts. Environmental impacts remain of less pressing concern compared with these other impacts, but will eventually feed back into the wildlife and scenic viewing possibilities (Figure 5.1).

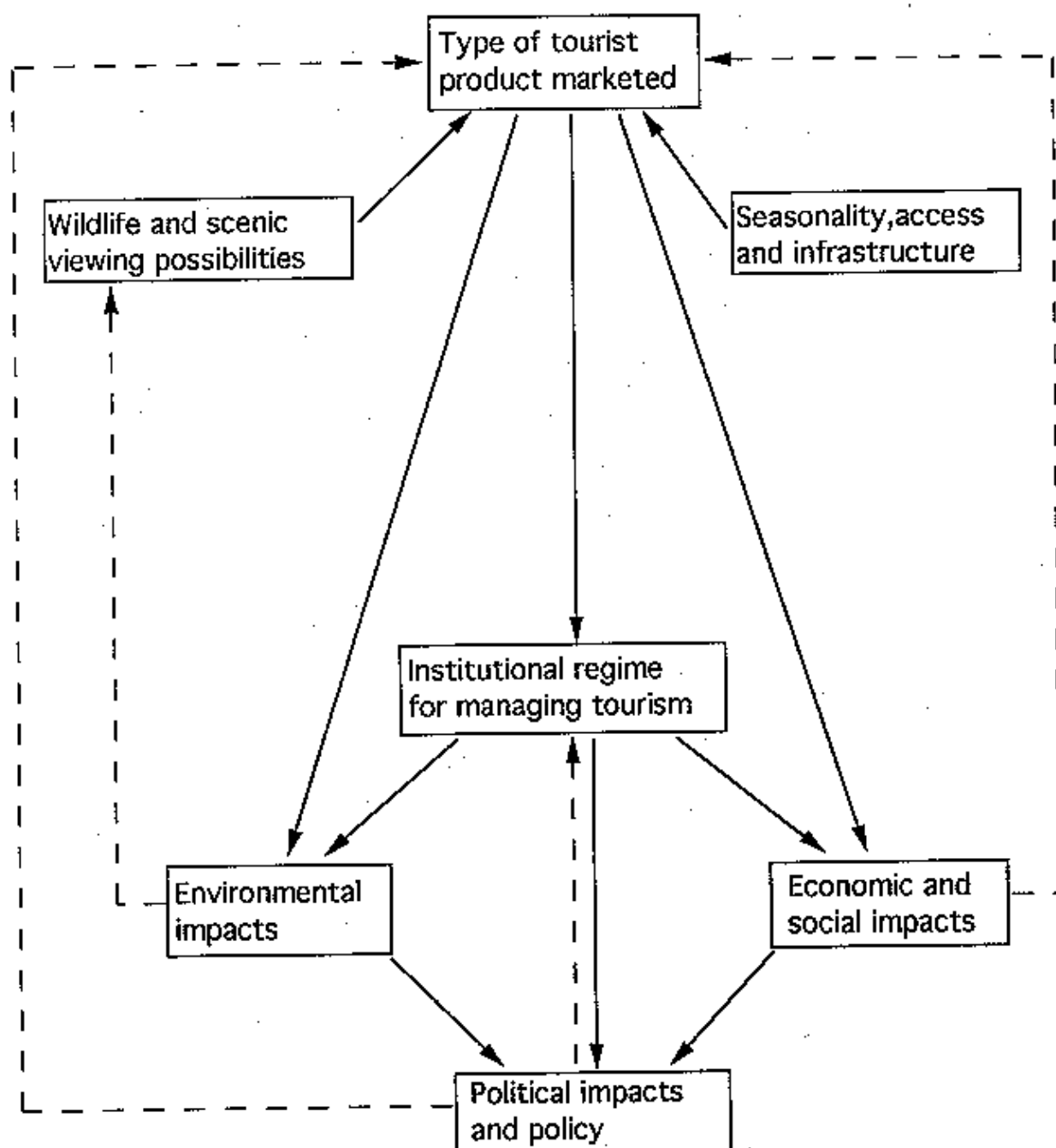
Another issue is that most studies have had a narrow focus on individuals or species. Research must be broadened to include higher levels of biological organisation and at different times of the year, including studies at high and low tourist seasons and at different biological seasons. This research should include studies of the effects of infrastructure on wildlife populations and movements, habitat edge effects, and non-site impacts (e.g. downstream effects), and should consider both key species targeted by tourists, and non-target species.

Research is also required on the significance of different impacts, and of the consequences of alternatives to tourism. Criteria need to be developed to evaluate significance. This could include specific studies of the impacts of tourism on species, communities and habitats that are considered particularly important or rare. Again, such studies need to be long-term and consider changes beyond the individual or species level. In order to develop better techniques for managing the impacts of wildlife tourism, research is required to identify suitable indicators by which impacts may be measured. These must be based in turn on furthering knowledge of carrying capacities, limits of acceptable change, and visitor impact management. Given the long-term monitoring that is likely to be required, it will be important to establish research in conjunction with managers of protected areas.

Research is also required to develop appropriate forms of monitoring, particularly participatory monitoring, which are manageable in protected areas (since their efficacy depends upon their continued use) and to assess the relative efficacy of different forms of adaptive management, particularly in the context of wider management objectives. For example, increased guiding may reduce impacts by regulating visitor behaviour, improve the tourist experience for the visitor, and generate skilled employment for local people.

This study has focused on environmental impacts of wildlife tourism. Nevertheless, minimising these remains but one of three objectives of the current push to achieve sustainable ecotourism. Many forms of tourism currently thought of as ecotourism would appear to fail in achieving a product that is not associated with environmental impacts. Equally, it is important that research on wildlife tourism advances on a broad front to consider the contributions that different wildlife tourism enterprises (including activities organised by protected area managers) make to conservation of the resource and to local communities. At present it appears that many enterprises fall far short of their lofty ideals.

Figure 5.1: A Framework for Examining the Impacts of Wildlife Tourism



Notes: The solid lines represent primary links that drive the system, while the broken lines represent feedback loops. Factors important in each box or group of boxes are further expanded in Tables 5.1 to 5.5.

Table 5.1: Factors Affecting Potential for Wildlife Tourism

In this and the following tables, each column represents a spectrum of categories, and there is no intended relation between columns across each row.

Wildlife, habitat and scenic interest of area	Visibility within area	Cultural interest of area	Seasonality of area	Accessibility and infrastructure around and within area	Political stability
Charismatic species, interesting habitats, good scenery	High visibility, easy movement	High cultural interest	Year-round	Easily accessible, transit route, good infrastructure	Politically stable
Lack of species, dull habitats, poor scenery	Low visibility, difficult movement	Low cultural interest	Seasonal	Remote and poor infrastructure	Unstable, wars or civil disorder

Table 5.2: Type of Tourist Product that can be Marketed

Origin of tourist	Reason for visiting	Type of use	Volume of tourists	Length of stay	Nature of tourist activity	Frequency and permanence of activity
International	Incidental	Non-consumptive	High volume	Overnight, long stay	Developed infrastructure and high technology	Permanent, fixed and long-term occupancy
Regional	Combined (beach and wildlife)					
Domestic	Focused	Consumptive	Low volume	Transit, short stay	Minimal infrastructure and low technology	Sporadic and shifting

Table 5.3: Institutional Management of Tourism

Status of area	Institution responsible for managing area	Base of operator selling tourism	Capital investment
Unoccupied PA	State-run	International	High, intensive
Communal land	Communally run	Domestic	
Private land	Private sector run	Local	Low, diffuse

Table 5.4: Impacts Affecting Sustainability of Tourism

Habitat fragility per unit of disturbance	Targeting of individual species	Economic returns nationally	Demand	Economic returns at community level	Cultural fragility	Political impact
High (e.g. mossbank)	Prone to disturbance (e.g. predators)	High national incentive and re-investment	Long-term, consistent	High local incentive and re-investment	Strong indigenous cultures	High national and local
Low fragility and rapid recovery	Immune to disturbance	Low national incentive	Short-term, fluctuating	Poor local incentive	Weak local cultures	Weak national and local

Table 5.5: Policy and Management Outcomes that Determine Future Tourist Policies

Policy regime	Management regime	Institutional structure for area
Strong and developed	Zoned and mixed enterprise	Government funded
	Evenly spread	Parastatal
Weak and ineffective	Unzoned and unplanned	Private sector involvement

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Take only photographs, leave only footprints: The environmental impacts of wildlife tourism

The **Wildlife and Development Series** is published by the International Institute for Environment and Development (IIED) to highlight key topics in the field of sustainable wildlife use. The series is aimed at policy-makers, researchers, planners and extension workers in government and non-governmental organisations world-wide. The series arises from two sources. Firstly by invitation of IIED to others working in this field, and secondly from IIED's own work.

Tourism based on wildlife is widely assumed to be inherently sustainable. Nevertheless, few attempts have been made to verify this assumption. The impact of tourists on the wildlife of certain East African game parks has been documented in some detail. However, little research has been undertaken on the environmental impacts of wildlife tourism internationally. Furthermore, the impacts associated with the recent upsurge in 'ecotourism' holidays have scarcely been considered.

This paper, commissioned by DFID, sets wildlife tourism in its global perspective, and reviews a broad range of different wildlife tourism initiatives and their associated environmental impacts. The study indicates clearly that it is not possible to make generalisations concerning the environmental effects associated with wildlife tourism. Whilst the environmental impacts arising from wildlife tourism are well appreciated, they are poorly understood. The available literature shows little quantitative basis. At present, much of it is descriptive or anecdotal with little hard data or scientific analysis. Only a few case studies were identified that actually document the environmental impacts of wildlife tourism. It is clear that development agencies need to consider proposals for wildlife tourism developments on a case-by-case basis in order to determine the environmental impacts that are likely to arise, and that further research is required in order to develop effective policies and plans for wildlife tourism.

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