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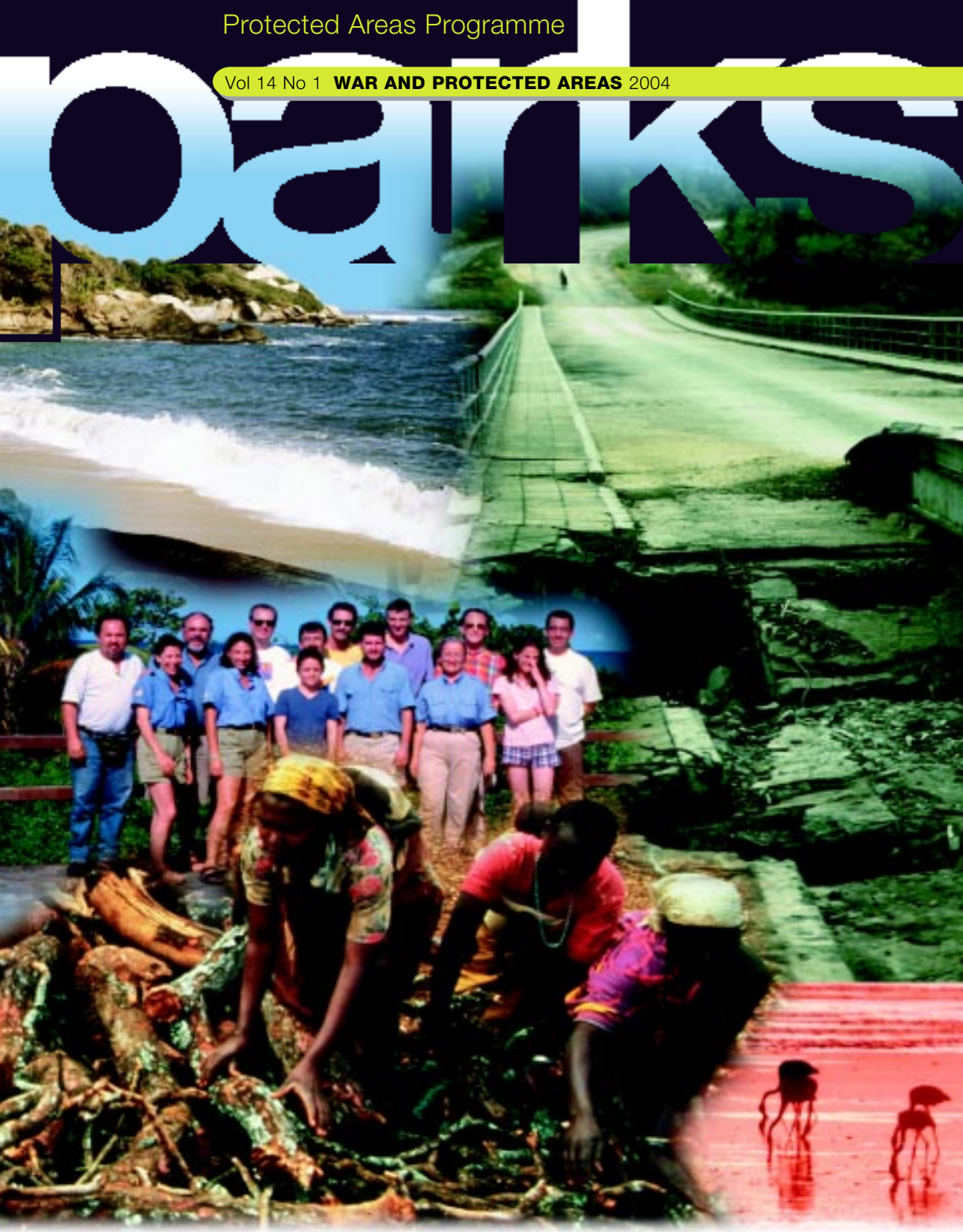

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***Parks* is published to strengthen international collaboration among protected area professionals and to enhance their role, status and activities by:**

- maintaining and improving an effective network of protected area managers throughout the world, building on the established network of WCPA;
- serving as a leading global forum for the exchange of information on issues relating to protected area establishment and management;
- ensuring that protected areas are placed at the forefront of contemporary environmental issues such as biodiversity conservation and ecologically sustainable development.

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Cover (clockwise from left):
Arrecifes Zone, Tayrona NP, Colombian Caribbean coast. PHOTO: E. RODRÍGUEZ. *Damage to infrastructure can seriously disrupt PA management – a bridge on the main access road to Gorongosa NP, Mozambique.* PHOTO: UNHCR. *Coastal, tidal mudflats in Kuwait: a vital feeding, resting and moulting ground for Arabian wintering bird populations.* PHOTO: FOZIA ALSDIRAWI. *Participants in the international workshop on biodiversity and tourism, Tayrona NP.* PHOTO: RAINER MÖNKE. *In times of conflict, protected areas may be the only place that displaced peoples can obtain resources.* PHOTO: UNHCR.

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Editorial

JEFFREY A. McNEELY

AS WE CELEBRATE the expansion of protected areas to nearly 15% of our planet's land surface, well over 100,000 individual sites, it is sobering to also recognise how many of these protected areas are threatened by various kinds of conflicts. This is certainly nothing new; virtually all protected areas have been established against the opposition of at least some interest groups, though the best-managed protected areas are able to provide sufficient benefits to the various interest groups to justify their establishment. But many of the threats to protected areas today come from a far more violent kind of conflict, where protected areas are simply caught in the crossfire of opposing armed groups.

In many parts of Africa, in Colombia, in Nepal, the islands of South East Asia, and some of the Central Asiatic Republics, armed insurgency movements show little respect for protected areas, putting extra stresses on the managers of these sites. The individuals who often are putting their lives on the line to carry out their nature protection duties deserve our admiration and support. But too often, the international forms of support for protected areas start to get cold feet when bullets start flying. This is perhaps understandable, but the steadfastness of some international conservation organisations is sometimes making a difference between total withdrawal and at least some modest successes. In this issue, the story of international cooperation in saving the World Heritage sites of the Congo is especially heartening.

Other sites tend to slip from the public consciousness, such as Comoé in Côte d'Ivoire, or the protected areas of Nepal. These two examples are cause for all of us to work together to continue supporting our colleagues in the countries that are faced with such conflict.

Fortunately, we have many models where cooperation has led to real improvements, with examples from the Sudan, Tayrona in Colombia, and even along the border between Kuwait and Iraq. And the opening paper on '*Parks in the crossfire*' sets out a series of useful strategies for effectively promoting protected areas even in the most difficult of times. We are all hoping for peace and tranquillity, but these qualities are not always in evidence, and conserving nature will undoubtedly require us to continue supporting our courageous colleagues who are continuing to protect valuable sites against destruction in very difficult times.

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Parks in the crossfire: strategies for effective conservation in areas of armed conflict

JUDY OGLETHORPE, JAMES SHAMBAUGH AND REBECCA KORMOS

Armed conflict can have huge impacts on protected areas and biodiversity through habitat destruction, over-use of natural resources, pollution, and impacts on management. This article draws on numerous case studies, reviews these briefly and then outlines possible ways to reduce impacts, including organisational responses, enhanced collaboration and policy, trade and governance aspects.

WARS ARE ALL TOO COMMON in many parts of the world, causing huge loss of human life, untold suffering, and large-scale social and economic disruption. Wars also have multiple impacts on biodiversity and protected areas, and livelihoods of local people dependent on natural resources.

Some environmental effects of armed conflict may be positive: for example, vegetation and wildlife may flourish in areas where access by people is limited, such as demilitarised zones. Impacts can be highly variable, and may be positive in some areas and negative in others (McNeely 1998). Very often, though, war has serious negative effects directly or indirectly on conservation. This article focuses on the negative impacts, and actions that protected area managers and conservation authorities can take to mitigate them.

Negative impacts are driven by factors such as the breakdown in rule of law; increased abundance of firearms; disruption of economic activity, agricultural production and trade; increased dependence on wild resources; and mass movements of people. The main direct impacts occur through habitat destruction, over-exploitation of natural resources, and pollution.

Large-scale movements of refugees and internally displaced people can have huge environmental impacts on protected areas located near receiving areas, along routes, and in home areas when displaced people return. Advance planning can help reduce impacts. Photo: UNHCR.

Habitat destruction: Vegetation may be cut, burned or defoliated to improve mobility or visibility for troops. Temporary settlement of large numbers of displaced people can result in deforestation and erosion. Protected areas are often vulnerable because they tend to occur in remote areas near international boundaries, and offer cover and natural resources. With habitat destruction, certain plant and animal species may become locally threatened or extinct, and species with limited ranges can be particularly susceptible.

Over-use of natural resources: Over-exploitation can occur for both subsistence and commercial reasons. Local people in rural areas are often unable to grow crops during wartime due to political instability, and increasingly depend on wild foods such as bushmeat and wild food plants for their survival. Protected areas may be the only place they can obtain these resources. Displaced people often use natural resources, both in the receiving area and when they return home before other forms of livelihood such as agriculture are re-established.

In areas where fighting is occurring large mammals are often hunted on a major scale to feed troops, and this can have a devastating impact on wildlife populations. Larger species with slow reproductive rates are particularly vulnerable. Commercial extraction of resources such as timber, ivory and diamonds often occurs to raise funds for military supplies and activities, and protected areas can be prime targets. The exploitation of valuable resources and availability of arms are parts of a vicious circle which enables armed groups to maintain control over source areas, resources and illegal trade networks. Large-scale extraction has been documented in the war economies of countries such as Liberia and Angola (Global Witnesss 1998, 2001). Proliferation of arms from conflicts often results in escalation of bushmeat trade.

When access to resources opens up again immediately post-conflict, private sector operators often move in and extract resources illegally. This occurred in Mozambique, for example, when hunters and loggers followed teams de-mining roads and reconstructing bridges (Hatton *et al.* 2001). During this phase the normal peacetime control measures of government and traditional leaders were largely absent.

Pollution: Pollution can result both directly and indirectly from conflict. The 1990–91 Persian Gulf War provided dramatic examples of the former, when huge volumes of oil were deliberately released into the Persian Gulf to discourage amphibious landings, and Kuwaiti oil wells were later set on fire as Iraqi troops fled that country (Ody *et al.* 1998). The spraying of defoliants in Indochina during the Vietnam War and the resulting toxic contamination of soil, water, and vegetation has had enormous environmental as well as human consequences.

Pollution resulting indirectly from conflict includes, for example, contamination of water sources by large concentrations of refugees and internally displaced persons living without adequate sanitary facilities or waste removal services. Infectious diseases may be spread to wildlife as well as human populations (Kalpers 2001). Unregulated mining can contribute greatly to soil, water, and air pollution.

Other impacts on protected areas: Infrastructure, vehicles and equipment are often damaged or destroyed, seriously affecting management and surveillance programs. Protected area staff may be forced to abandon their posts, or in some cases even killed. Expatriate and senior staff often evacuate first, leaving relatively inexperienced junior staff holding extremely responsible positions in very difficult situations for which they have little or no training. 'Brain-drain' may occur, where national staff with higher education flee the country, and do not always return. This can leave relatively few well-educated people in the sector, and low capacity for post-conflict rehabilitation of protected area systems. If training ceases completely during prolonged conflict a protected area organisation can miss a whole generation of trained staff.

When a long war finally ends, only a small number of experienced older people remain, whose numbers continue to decline through attrition and retirement.

The ability to continue conservation work is often hampered by lack of funding. At key times flexible and quickly disbursed funding is needed: for example, for radios to improve communication, or for a workshop to revise the protected area strategy. Donors are traditionally slow to fund conservation during conflict and transition to peace, when they focus on humanitarian assistance and improved democracy and governance. However, relatively small, strategic funding at these times can make a big difference for the long-term future of protected areas and the natural resource base upon which many local people depend.

What can protected area managers and their organisations do to reduce the impacts of war?

There are various ways to reduce impacts on protected areas and safeguard staff. Often windows of opportunity open up at different times before, during and after conflict and it is important to be able to respond rapidly, because the opportunities close quickly too. No two situations are the same so no blueprint can be applied everywhere. Priority actions have to be chosen based on local circumstances; it is important to be flexible and adapt strategies as the situation evolves. Some of the most successful approaches are highly innovative, and can involve working with new partners in multi-disciplinary settings. Many of the approaches in this article are explained in more detail in Shambaugh *et al.* (2001).

Organisational responses

Impact assessment and response: In regions where political instability exists or is likely to occur in the future, strategic contingency planning should include a review of actual or potential impacts of armed conflict and opportunities for mitigation. This assessment should also address the degree of risk. Impact mitigation should be incorporated into protected area and national strategies. For example, provision may be made to conserve species and habitats in a network of protected areas rather than gambling everything on one area. Corridors may be planned so that if large mammals in one protected area are devastated during conflict, it can be repopulated after conflict by in-migration. Various rapid environmental assessment tools have recently been developed, for example for emergency situations by Kelly (2001), and for post-conflict situations by the United Nations Environment Program (http://postconflict.unep.ch/).

Often protected area staff focus too narrowly on biological aspects of conservation. They also need to address political, development and socio-economic issues as they relate to conservation. These issues often change rapidly in unstable political conditions at local, national and sometimes regional levels.

Maintaining capacity: During long-term conflicts, conservation organisations can sometimes help to prevent loss of technical capacity by employing protected area staff in other more stable parts of the country until they can return. Capacity can be built to prepare for peacetime by providing training for nationals outside the country if local training institutions have closed. Capacity of national and junior staff should be built not only in managerial and technical skills, but also in diplomacy and cross-sectoral collaboration, in case they have to take over from their supervisors.

If the protected area authority has no experience of working in armed conflict situations it should consider recruiting conservation staff or consultants with conflict experience from elsewhere. Conservation success is more likely with this expertise at hand. After conflict, demobilised soldiers can sometimes be recruited for field operations. They often have the requisite skills, and well supervised, gainful employment prevents them from turning to unsustainable use of natural resources or banditry as a means of livelihood.

Local impacts of refugees on protected areas can be reduced by supplying fuelwood from less sensitive and more sustainable sources, and promoting efficiency in fuel use. Photo: UNHCR.

Maintaining a presence: During conflict it is very important for conservation organisations to maintain a presence in protected areas where possible, even if their level of operations is greatly reduced. When a presence is maintained developments can be tracked more closely, and short-term activities executed when opportunities arise. Operations can be expanded as soon as peace returns. In Rwanda and Democratic Republic of Congo, protected areas where projects continued during conflict suffered less damage to biodiversity (for example, Garamba National Park, Okapi Faunal Reserve and Kahuzi Biega National Park in DRC, and the Virunga Volcanoes National Parks in DRC and Rwanda) (Plumptre 2000; Hillman Smith and Mafuko 2000).

Supporting staff: Staff are key to maintaining a presence. Material and moral support for staff is critical in enabling conservation to continue, and should be a high priority. Lines of supply, including regular salary payments, make a big difference to staff and good communication networks are important for their safety. It is very important to give people hope for the future, to maintain morale. However, organisations need to assess realistically the risks to staff, and be prepared to evacuate them when necessary. Staff may be too close to the situation to make this decision on their own. Tragically, staff have been injured and killed in several protected areas in Africa in the last few decades. It is important to make provision for families of staff injured or killed in action: this was a specific recommendation from the 2003 World Parks Congress (IUCN 2003).

Maintaining neutrality: Conservation staff should try to remain neutral in their interactions with armed forces and political groups, or they may put themselves and their programs at risk.

Funding and finance issues: If government funding drops and bilateral and multilateral donors pull out, other sources of funding may be possible, such as foundations or international NGOs with their own funds. Even modest amounts of support to pay park staff and cover basic operating expenses and field equipment may be enough to maintain a site-level presence and some level of control. For example, the United Nations Foundation is supporting a project established by ICCN and conservation NGOs working in eastern DRC to manage five World Heritage Sites (Dubonnet and Hillman-Smith this volume). Sound financial management systems are very important to ensure that funds are used effectively and to provide accountability to donors.

Collaboration

Collaboration with others in the conservation community: Enhanced collaboration with other conservation organisations (government departments, conservation NGOs, and the private sector, if still operating) can increase conservation effectiveness during conflict through sharing of information, expertise and resources, streamlining processes, and developing joint responses to threats and opportunities. After conflict, the government sector often has low capacity at a key time in national reconstruction. NGOs may be able to help rebuild capacity and provide technical advice, for example in new policy development. Collaboration is easier if relationships have been established before the conflict.

Collaboration with the relief and development sectors: In recent years several excellent environmental guidelines have been produced by the humanitarian sector for mitigating the environmental impacts of their operations, for example, UNHCR (1998). However, relief sector staff do not always receive training and technical support to implement the guidelines. The conservation sector can promote guidelines and assist with training programs for the relief sector. Protected area authorities should collaborate closely with the relief sector during emergencies to reduce impacts on the ground. Aid workers often have good security intelligence of value for staff safety. Collaboration should continue after conflict when displaced people are resettled and the development sector replaces the humanitarian sector to help restart economic activities. Raising awareness of potential environmental impacts and ways to mitigate them at this stage can make a very large contribution to sustainable development.

Working with local communities: While conservation organisations should keep their long-term goals firmly in sight, they may have to adopt new strategies and modify the activities they undertake during conflict. This often involves helping local people meet their needs in a way that puts least strain on natural resources, so that longer-term livelihoods are not threatened. Local community involvement in resource management during peacetime can result in better conservation during conflict. In Rwanda, local communities who had benefited from gorilla-based tourism before the war looked after the gorillas during conflict even though income from tourism revenues had ceased, in the hope that it would restart once peace came (Plumptre 2000).

Communicating with the military: Interaction with military personnel can help to lessen impacts by troops on the ground, though this can be a very repetitive process if there are frequent changes in military personnel. It is important to remain neutral and opportunities to collaborate with military depend on the local situation.

Transboundary collaboration: Transboundary collaboration during conflict can help to control escalating cross-border illegal resource extraction, monitor the security situation on both sides of a border, mitigate the impacts of refugees crossing borders, and seek opportunities for post-conflict assistance in rehabilitation (van der Linde *et al.* 2001). During conflict in the Republic of Congo, Wildlife Conservation Society staff, equipment, and archives from the Nouabale Ndoki project were evacuated across the border to the adjacent Dzanga Sangha Reserve in the Central African Republic. From there, staff were poised to return as soon as possible (Blom and Yamindou 2001).

Policy

Sweeping new policies are often formulated during the post-war era which can have long-term consequences for protected areas, natural resources and livelihoods of rural people. Often, there is a new willingness to adopt more enlightened approaches to natural resources and environmental

management, as well as revising policies of other sectors that may harm the environment. The post-war era can be a time of great rehabilitation activity and national development, especially if new political conditions attract large amounts of donor funding and private investment. If not carefully planned, however, this can result in development that deepens negative environmental impacts. The post-war phase can also be a time of confusion and poor communication across sectors. Often, a different group of people are in control, and they may have little technical training or experience in government and governance. Yet the decisions they make and the control they exert in early postwar times will have great influence for many years to come. Protected area authorities can play a very important role in enhancing integration of conservation, environmental governance and sustainable use concepts into national and local policy and development plans.

Trade and governance

Depending on the breadth of their responsibilities over natural resources such as wildlife and timber, protected area authorities should build their capacity to regulate the private sector, especially during transition periods. The worst excesses of natural resource grabbing by less scrupulous elements of the private sector usually occur during transition periods when controls are weak and arms are plentiful. Ability to regulate the private sector as soon as possible following a conflict can go a long way toward minimising impacts. Where feasible, to encourage socially and environmentally responsible practices by the private sector, including multi-national companies. International policy mechanisms such as CITES can help, as can green consumer pressure. Where possible, promote sound and equitable natural resource governance systems ensuring sustainable livelihoods for local communities.

A final word

This paper has outlined some of the major impacts of armed conflicts on protected areas, and possible mitigation measures. Armed conflict tends to isolate protected area staff in difficult and dangerous circumstances, yet this is the time when they can most benefit from outside experience and moral support. Continued networking, learning and sharing of armed conflict lessons is crucial for conservation.

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Supporting protected areas in a time of political turmoil: the case of World Heritage Sites in the Democratic Republic of Congo

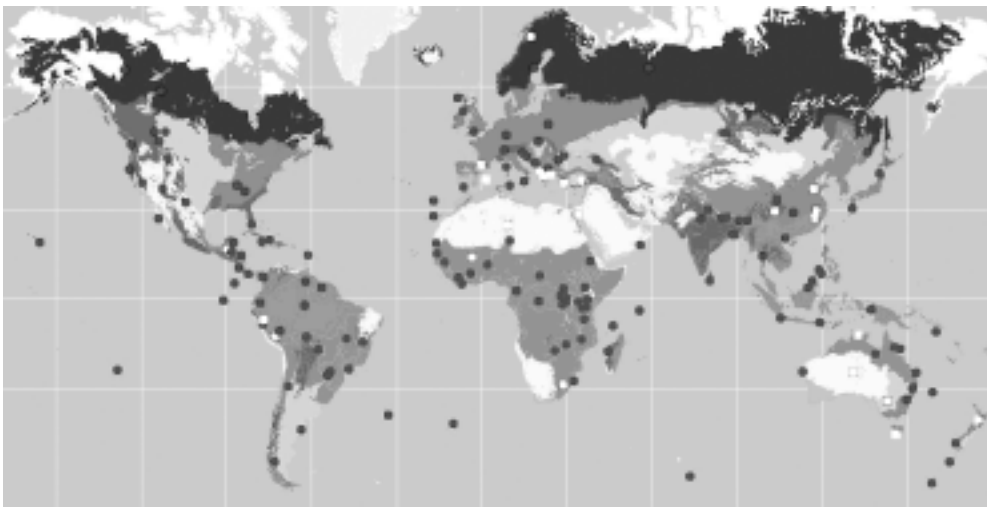
GUY DEBONNET AND KES HILLMAN-SMITH

The five World Heritage Sites in the Democratic Republic of Congo (DRC) hold valuable biological resources, including endemic species and sub-species of charismatic animals, such as gorillas, white rhinoceros and okapi. These sites have been seriously threatened by civil war in the DRC over the past eight years. Yet the news is not all bad. A major international effort coordinated through the World Heritage Centre and involving numerous non-governmental organisations, have enabled the protected areas to continue functioning despite the turmoil around them. This effort has taught important lessons about managing protected areas in times of violent conflict, including flexible design of field interventions and continued support, building alliances with local people, maintaining support for conservation activities, and cooperating with military forces from all sides.

THE WORLD HERITAGE CONVENTION was established in 1972 to protect natural and cultural heritage of outstanding universal value. 'Natural heritage' designates outstanding physical, biological, and geological features; habitats of threatened plants or animal species and areas of value on scientific or aesthetic grounds or from the point of view of conservation. The Convention has 176 States Parties, making it an almost globally recognised international legal instrument. The UNESCO World Heritage Centre, situated in Paris, France, is the secretariat to the Convention, and The World Conservation Union (IUCN) is the Advisory Body to the Convention on natural heritage issues.

Under the Convention, States Parties are encouraged to nominate natural and cultural sites of outstanding universal value for inclusion in the World Heritage List. Currently this list comprises 754 properties in 129 States Parties, of which 149 are natural sites and 23 mixed sites, designated for both their natural and cultural values. These natural sites account for almost 12%

Figure 1. *Map showing geographical distribution of Natural (black dots) and Mixed (white dots) World Heritage Sites.*



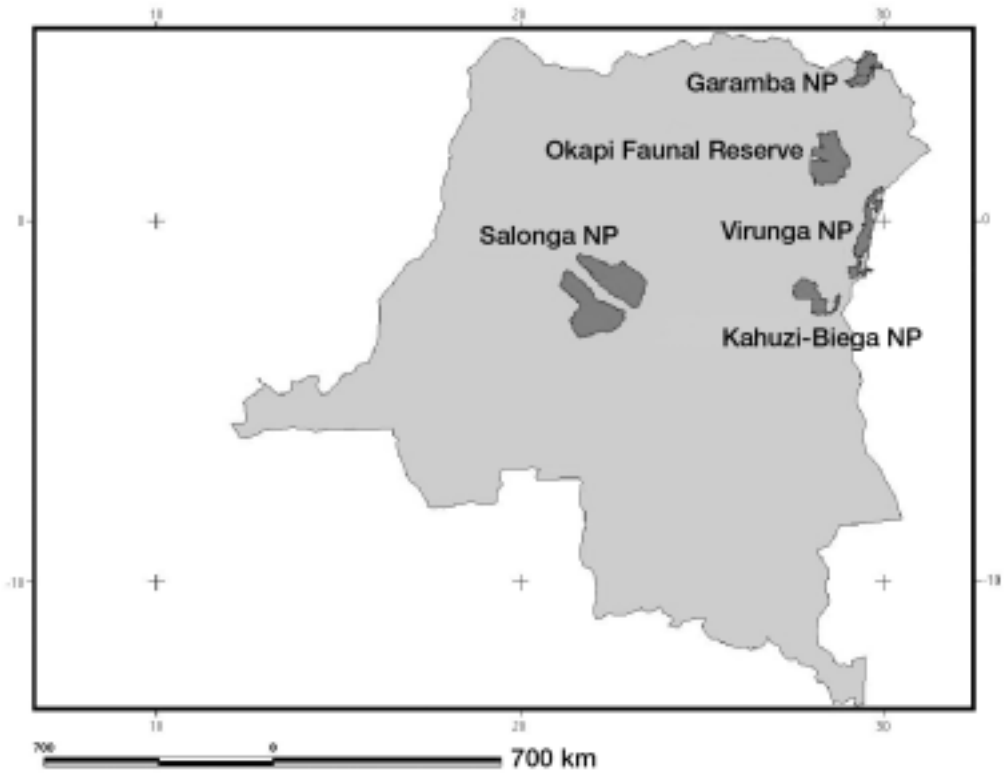
of the world's land surface designated as protected areas. Designation as a World Heritage Site implies both a universal recognition of the special value of the site, but also a greater international as well as national responsibility in conserving it.

The State of Conservation of the World Heritage Sites is monitored through the Advisory Bodies to the Convention, in the case of natural heritage IUCN, with assistance of the World Heritage Centre and is reported back regularly to the World Heritage Committee, governing body of the Convention. Information is gathered through regular contacts between the World Heritage Centre, the States Parties and the Advisory Bodies. If necessary, site visits can be organised in the framework of 'Reactive Monitoring' as provided in the Operational Guidelines of the Convention. Furthermore, States Parties report on the State of Conservation of their sites as part of the Periodic Reporting exercise, which takes place every five years. In case of serious imminent threat, a property can be placed on the List of World Heritage in Danger. Currently 35 properties are listed as endangered, including 17 natural properties. If a property no longer fulfils the criteria for which it was listed, it can be removed from the World Heritage List.

The World Heritage Convention in the Democratic Republic of Congo

With over 11,000 plant species, 409 mammal species, 1,086 bird species, 1,069 fish species and 152 reptile species currently described, the Democratic Republic of Congo (2,345,480 km^2) is one of the most biologically rich nations on earth. Protected areas cover approximately 12% of the country. DRC has always been, during times of peace as well as war, a keen adherent of the Convention's principles. The country was one of the first to ratify the World Heritage Convention in 1974. Virunga National Park, Africa's first national park established more than 75 years ago, was the first site to be inscribed on the World Heritage List in 1979. Garamba National Park

Figure 2. *World Heritage Sites in the Democratic Republic of Congo.*



(1980), Kahuzi Biega National Park (1980) and Salonga National Park (1984) soon followed. In 1996, the newly established Okapi Wildlife Reserve was also inscribed on the World Heritage List.

All these protected areas are harbouring biodiversity of outstanding universal value, including several endemics and flagship species, and cover a variety of habitats. The **Virunga National Park** comprises 8,090 km^2 of plains, lakes, mountains, active volcanos and montane forest, habitat of the unique mountain gorillas *Gorilla gorilla berengei*. **Garamba,** a 4,900 km^2 National Park, surrounded by 7,500 km^2 of Hunting Reserves, comprising Sudano-Guinean savannah grassland, rivers and woodland, is home of the last wild population of the northern white rhinos *Ceratotherium simum cottoni*, the only northern savannah giraffes *Giraffa camelopardalis congoensis* and one of the densest elephant populations remaining in Africa. The **Kahuzi-Biega National Park**, covering 6,000 km^2 of continuous montane and lowland forest harbours the endemic Grauer's gorillas *Gorilla gorilla graueri* as well as other threatened forest species including the forest elephant and the endemic Congo peacock *Afroparvo congensis,* giant gennet *Genetta victoriae* and aquatic civet *Osbornictis piscivora.* The **Okapi Faunal Reserve** is an area of 13,726 km^2 of the Ituri Forest, conserving its high biodiversity and endemism, including the unique okapi *Okapia johnstoni.* Its large tracts of intact forest are essential to maintain the lifestyle of Mbuti pygmies. To the west is the **Salonga National Park**, which protects 36,000 km^2 of Congo Basin forest, acclaimed to be the world's second largest tropical forest national park. The site is the one federally protected area for the pygmy chimpanzee, the bonobo *Pan paniscus*.

The Garamba National Park was inscribed on the World Heritage in Danger List for the first time in the period from 1984 to 1992, due to a serious decline in the population of the white rhinoceros which occurred between 1978 and 1984. As a result of actions undertaken by the Garamba National Park Project – a coalition of supporting NGOs, principally UNESCO / World Heritage Committee, IUCN, WWF, the Frankfurt Zoological Society, with the national authorities – the rhino population made a recovery from a meagre 15 individuals to around 30 animals in eight years, and the site was removed from the Danger List at the 16th session of the Committee in 1992, but has since then been subject to ever increasing exploitation linked to the war in adjacent Sudan.

As a result of the conflicts that have ravaged the Great Lakes Region and DRC since the early 1990s, all five sites were progressively put on the World Heritage in Danger List (Virunga National Park in 1994, Garamba National Park in 1996, Kahuzi-Biega National Park and Okapi Faunal Reserve in 1997 and Salonga National Park in 1999) and continue to remain there.

Supporting the DRC World Heritage Sites in a time of political turmoil

For many years the Institut Congolais pour la Conservation de la Nature (ICCN), the national conservation agency, struggled to conserve DRC's five World Heritage Sites in the context of a deteriorating national economy and a collapse of the political system. In partnership with dedicated NGO's and bilateral agencies, ICCN was able to maintain relatively high management standards of the sites. Since 1994, the consequences of the conflicts that erupted in the Great Lakes region have threatened the existence of the sites as a result of proliferation of arms and ammunition; displaced people, military, and dissidents; a general breakdown of law and order, uncontrolled exploitation of natural, mineral and land resources by various interest groups; and the increased use of wild areas as refuges and for subsistence. Neighbouring unrest, notably the long-standing civil war in Southern Sudan, conflicts in Uganda and the civil war and devastating genocide in Rwanda, affected the border sites of Garamba, Kahuzi-Biega and Virunga through exploitation, military presence and refugees. In 1996 the country itself plunged into civil war, and in the initial wave of the change in power all ICCN park staff were disarmed and anti-poaching patrols stopped. Wildlife populations were seriously affected in Garamba and Virunga and the other sites also suffered from increased poaching and pressure on natural resources. With a new

government which was very supportive of conservation in place in Kinshasa in 1997, the parks were slowly recovering with the support of partner conservation organisations. In 1998, the second civil war broke out, leading to political instability that has existed since then with different rebel groups and political factions occupying different parts of the country. In spite of significant progress made at the political level, culminating in the recent establishment of a national unity government, the situation in the eastern part of the country, where four of the World Heritage Sites are located, continues to be unstable and extremely volatile.

To tackle the progressing degradation of the sites, ICCN, together with the World Heritage Centre and its conservation partners[1] working in the different World Heritage Sites, organised a workshop in March 1999 to analyse the State of Conservation of the sites and the critical issues for their survival and to identify possible solutions. Following the workshop, the World Heritage Fund released limited emergency assistance to address some of the emergency issues. On the basis of the analysis made during the workshop, ICCN, the World Heritage Centre and the conservation NGOs involved, worked in partnership to prepare a project proposal to test innovative answers to the pressing conservation problems of the sites. With funding from the United Nations Foundation, this new four-year project on 'Biodiversity Conservation in Regions of Armed Conflict: Protecting World Natural Heritage in the Democratic Republic of Congo' was able to start its activities by the end of 2000. The value of the World Heritage Convention in attracting international support and the neutral status of the United Nations have been crucial factors in the success of this project.

Key features of the programme include:

- At both site and national level, a collaborative management and decision making structure was set up under the leadership of ICCN. This has helped to reinforce the technical management of conservation with recognition of ICCN as the overall body despite political divisions in the country.
- During project preparation, it was recognised that the protected area staff are the key front line components of maintaining conservation and need to have assured support. Over 75% of the project funds provide direct support to the ICCN field site staff. Partner projects continue to support the senior staff at each site and are the implementing agencies for getting the support to the field in the flexible manner necessary under the circumstances.
- Within a politically divided country, over 65% of which is governed by different rebel groups, both the legal and political system as well as the authority of the central protected area administration broke down. The project actively used the Convention to gather support with local military authorities, leaders of rebel movements and governments of other States Parties involved in the conflict (Rwanda and Uganda) for the conservation of the sites and to facilitate the work of ICCN field staff. The World Heritage Centre has also facilitated meetings to assure communication and joint decision-making at a technical level between the conservation authorities in the different political regions.
- Capacity building of the ICCN staff is another key objective. The responsibilities and challenges increase during armed conflict, with increasing and changing threats from poaching, mining, military presence, encroachment and dissidents. It comprises training in conservation law enforcement, law enforcement monitoring, ecological monitoring and senior staff responsibilities.
- Law Enforcement Monitoring is the standard structured recording and mapping of normal law enforcement activities. This is a tool for protected area managers, increasing their

1 Gilman International Conservation (GIC), Deutsche Gesellschaft für technische Zusammenarbeit (GTZ), International Gorilla Conservation Programme (IGCP), International Rhino Foundation (IRF), Milwaukee Zoological Society (ZSM), Wildlife Conservation Society (WCS), World Wide Fund for Nature (WWF), Zoological Society of London (ZSL)

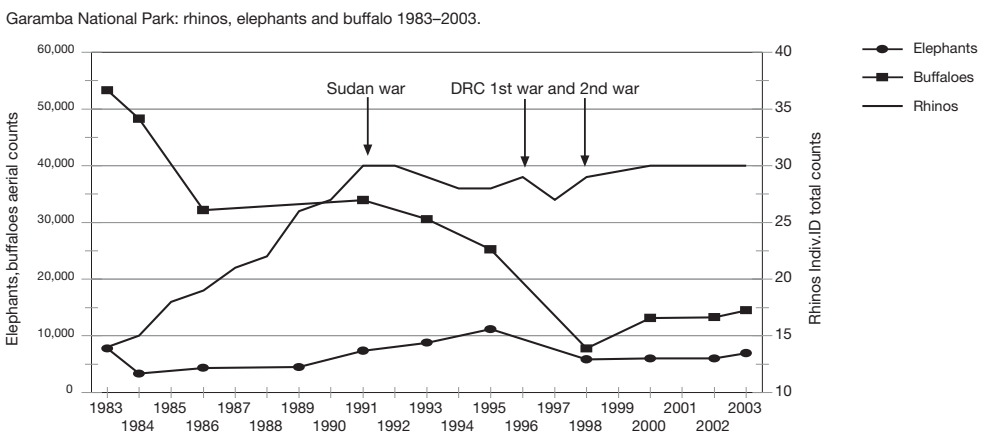
capacity to manage and protect the site by an on-going knowledge of the amount, type and distribution of threats and a measure of the amount, type and distribution of their human resource deployment. It is further a tool for calculating effort and results-based payments to field staff and measuring the effect of project input on a change in conservation effectiveness.

- Wildlife and habitats are features that have justified World Heritage status. The programme aimed to assess the status of key wildlife components after the wars and again after the four year-project, while at the same time training ICCN personnel in the techniques. Figure 3 shows results of game counts from Garamba for the period prior to and during the war as an example of how the input of this project has helped stabilise the key wildlife populations, thereby both using and maintaining World Heritage status. The project, with the help of partner NGOs, other projects and universities, is currently concentrating on baseline surveys, the development of base maps and the establishment of a national bio-monitoring database system.
- Local communities have suffered extremely as a result of the war and are heavily dependent on the natural resources of the protected areas for shelter and subsistence. Furthermore, disputes over access to natural resources lie at the heart of some of the local conflicts that are maintaining the war. In Kahuzi Biega, many people from the surrounding villages were forced to hide out in the reserve for protection and mining was exploited in the park, with the wildlife as the chief food source. The greatest problem for Virunga is encroachment. Over 38% of sub-units in the recent count of north Virunga showed between 10 and 100% encroachment of agriculture, pastoralism and timber extraction and charcoal. The project, with support of the government of Belgium, is currently executing some pilot community conservation projects, testing out ways and means of addressing some of these conflicts and at the same time improving conservation of the sites.

Lessons learned on supporting protected areas in a time of conflict and political turmoil

The experience of the project demonstrates that it is extremely difficult to ensure long term conservation of protected areas in conflict regions. The combination of security problems, increased poaching by armed gangs, lawlessness and anarchy, uncontrolled exploitation of the natural wealth by the warring factions, major movements of refugees and displaced people, and other external factors, combined with an inevitably weakened protected area administration through loss of authority, breakdown of government structures, destruction and looting of protected area infrastructure, non-payment of staff salaries, disarming of guard personnel,

Figure 3. *Example of wildlife figures in relation to wars and UNESCO/UNF Project.*



etc. will inevitably lead to the ecological degradation of protected areas. Long term conservation of the protected areas can only be ensured through the return of peace, security and stability. The objective of conservation actions in regions of political turmoil and armed conflict therefore has to focus on **limiting the damage** and securing as far as possible the ecological potential of the protected area so that recovery and rehabilitation after the return of peace still is possible.

This raises the inevitable question whether further investments in these areas are worthwhile. The answer can only be that we have no other option: some of the areas with the highest biodiversity in the world are located in regions characterised by conflicts and political instability so that the international community and in particular conservation organisations cannot afford to give up on them. If no effort is made to maintain basic conservation operations, there is a serious risk of rapid degradation of these sites to a level where an ecological recovery might become impossible. Experiences in ecological rehabilitation of damages induced by refugees around the Virunga National Park in DRC shows that these operations can be extremely expensive. In the case of sites covered by the World Heritage Convention, the international community also made a commitment to assist States Parties with their obligation under the Convention to conserve the site.

Although it might be too early to draw generalising conclusions from the DRC case study, on the basis of the experience from the project, it seems possible to give some guidance on how to successfully limit ecological damage in protected areas in regions of conflict. Key elements are:

- **Flexible design of field interventions and continued support**
  In conflict regions, the situation in the field tends to change rapidly and any conservation interventions must be able to adapt to this changing environment. It means that design and planning of field interventions should allow for changing conditions and a complete review of planned activities should be possible if the situation imposes this. This requires high flexibility from the intervening agency and from the donor. Conservation NGOs are usually able to work in a more flexible way in the field than bilateral or multilateral cooperation agencies, especially under conditions of political instability. Too often, donors withdraw their support when conflict situations arise. Reasons can be political, or the crisis may be impeding project objectives. However, it is especially important to maintain donor commitment, and partnerships with national staff, in times of crisis.

- **Direct support for conservation activities in the protected area**
  In conflict situations, park guards and other protected area field staff are often the only people that still have regular access to protected areas. It is crucial that field staff receive adequate support to continue their conservation activities. It is important that payment of their salaries is guaranteed and that all efforts are deployed to improve their working conditions under these very difficult external conditions of insecurity. This will most often involve taking over some costs that normally are covered by the government budget. Apart from salary support and necessary equipment (uniforms, field rations, field equipment, etc.) it is also important to ensure that they receive paramilitary training adapted to the new levels of threats and insecurity. Through law enforcement monitoring, it is possible to evaluate patrol efforts and through ranger based bio-monitoring, basic data on biodiversity trends can also be gathered.

- **Building new alliances with the local population**
  The experience of DRC has shown that in times of conflict, protected areas are easier to conserve where good relations are established with local populations. In the context of a generalised breakdown of law and order, traditional authorities gain influence and are often the only form

of governance that is respected by local people. Where the park authorities were able to build a relationship of mutual trust with these authorities, they are willing and able to enforce conservation regulations in their constituencies, filling a critical gap of authority.

- **Mobilising political support for the conservation of protected areas from all parties involved in the conflict**
  Even more than in other conservation projects, the battle for the protected areas in regions of conflict is won or lost at a political level. It is therefore necessary to establish high-level contacts with the civil and military authorities, including rebel groups if necessary. They have to be informed of the mission of the protected area administration in managing and conserving protected areas and of the technical nature of their work, including paramilitary activities. It is extremely crucial to convey the message of the neutrality of conservation activities and thus of the field staff to all parties engaged in the conflict. As it is often difficult for protected area authorities and even conservation NGOs to establish these contacts, bi- and multilateral agencies can play a key role in facilitating this, since they have easier access to government levels and often are represented in the different countries involved in the conflict. The DRC case has shown that it is possible to use international conventions, in particular the World Heritage Convention, as a tool to leverage this political support. However, a greater involvement of bilateral political and diplomatic channels would further increase the effectiveness of this strategy. Parallel to these activities, it is important to organise an international information campaign on the impact of the conflict on the state of conservation of the sites and on efforts deployed to save them. International attention can increase significantly the willingness of the authorities to support protected area conservation activities.

- **Cooperation with the military**
  Protected areas are often used as safe havens and refuges for armed groups involved in conflicts and therefore tend to be in the centre of military action. Even when field staff can be trained to adapt to higher levels of threat, it will often be impossible to secure the protected area without active cooperation from military authorities. However, the military themselves often constitute a major threat to the natural resources of the area, since many armed groups tend to exploit natural resources for subsistence and profit. It is therefore crucial to try to develop a positive cooperation with the military authorities, without however sacrificing the neutrality of the protected area administration in relation to the conflict. This cooperation should be developed at both the local level (local military commanders) and at the very high level of military decision-making. Where specific mixed or training operations are carried out with local people, clear-cut agreements need to be signed to define the limits of their intervention and avoid it getting out of hand. It is extremely important to accompany these efforts with an information campaign which will inform the local population and other interested groups of the conservation objectives.

- **Strengthening the capacities of protected area authorities and local staff at site level**
  Too often, protected area administrations centralise all important management decisions at headquarters or regional offices. In many cases, protected area managers also depend on outside advisors. Experience in the DRC case has shown that, with all communications with headquarters cut and outside advisors being forced to leave the protected areas because of security concerns, it is important to build strong local protected area institutions. The DRC case has taught that stronger park administrations were clearly better equipped to deal with crisis situations. Decentralising management decisions at the site level is an important step to empowering protected area managers. Equally important is capacity building of local staff at field level.

- **Strengthening transboundary cooperation**
  Even more than other protected areas, transboundary protected areas tend to be very seriously affected by conflicts: they are ideal hide-outs for rebel groups, become battle grounds if fighting breaks out and are also used by refugee populations. An example is the Virunga National Park in eastern DRC. However, the Virunga case shows that if transboundary cooperation is set up prior to the conflict, it is possible to keep it going. However, a 'neutral and external' player, in this case the International Gorilla Conservation Programme, was crucial in facilitating this process.

Conclusion

Conserving protected areas in regions of armed conflict remains a major challenge. However, given that a large number of these protected areas are key priority sites for biodiversity conservation, the conservation community has to find innovative ways and means to safeguard their ecological potential. The option of not intervening bears the risk of fast degradation of the ecological values of these sites to a point where no recovery will be possible when peace and stability returns. Preventative actions to minimise damages might actually be a more cost-effective way than ecosystem rehabilitation after the conflict. Key elements for conservation actions in regions of armed conflict are to strengthen local capacities at field level to ensure continued management of the site, to maintain donor partnership support as far as possible throughout, and to mobilise, through political, diplomatic and advocacy activities, the support of the parties involved in the conflict. With regard to World Heritage Sites, the DRC case has shown that the Convention can be used in an innovative way to bring about the necessary political support.

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parks

Status of the Comoé National Park, Côte d'Ivoire, and the effects of war

FRAUKE FISCHER

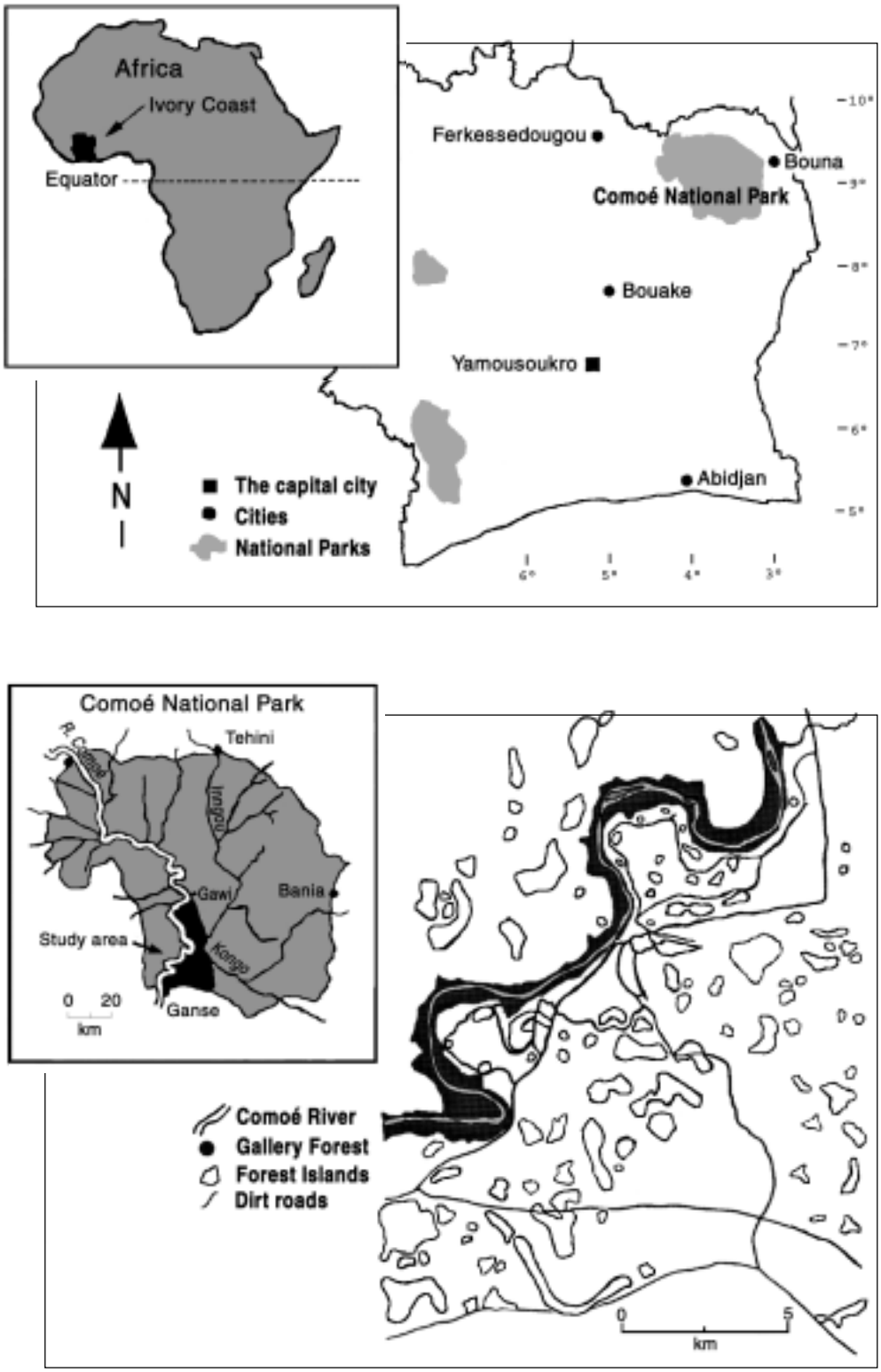
The Comoé National Park (CNP) is West Africa's largest savannah park, hosting an enormous diversity of animals and plants in a large variety of habitats. Some of its faunal and floral elements are rare or threatened in West Africa; others find their last national refuge in the CNP. Mainly due to a severe lack of financial resources, management activities have been insufficient for about 20 years, resulting in a heavy increase of poaching within the park. This in turn led to dwindling large mammal populations, with the consequential reduction of financial revenue from non-consumptive wildlife use like tourism. The outbreak of a rebellion that followed a failed coup attempt in September 2002 led to the development of a front line that still runs through the southern parts of the park. The situation worsened with the complete collapse of any management structure, retreat of international scientists and a reported increase in poaching. If an assumed war-zone refuge effect ever existed, it only persisted for a very limited time period. The boundaries of the park and the diversity of its habitats are not yet endangered and most mammal populations are still viable. Immediate and efficient international cooperation is needed to save the park. In the long term, the potential establishment of a trans-frontier conservation area connecting the Comoé NP with the Mole NP in Ghana and sites in Burkina Faso would be very desirable.

THE 'PARC NATIONAL DE LA COMOÉ' (CNP), covering 11,500 km^2 – almost 4% of Côte d'Ivoire's land surface – is West Africa's largest and perhaps even Africa's most diverse savannah national park. It is located in the Guinea and Sudan savannah zone in the northern part of the country between 9°6´N–8°5´N and 3°1´W–4°4´W (Fig. 1). Established in 1926 as the 'Refuge Nord de la Côte d'Ivoire' it was enlarged in 1942 and renamed as 'Réserve Faune de Bouna', becoming a national park in 1968. In recognition of its unique flora and fauna, the Park was inscribed on the UNESCO World Heritage List in 1983. Due to the alarming situation the Park was added to the List of World Heritage Sites in Danger in 2003.

The habitat mosaic in the Park is home to a wide variety of plants and animals. So far more than 1,200 species of plants (Porembski pers. com.), about 155 species of mammals (Fahr 1996, Fahr pers. com., Mess and Krell 1998, Fischer *et al.* 2002), 504 species of birds (Salewski 2000, Schröder pers. com., Reindt pers. com.), 35 species of amphibians (Rödel 1996), 71 species of reptiles (Rödel 1995, Rödel *et al.* 1995, Rödel *et al.* 1997, Rödel *et al.* 1999), and over 60 species of fish (Moritz, pers. com.) have been documented in the Park. The respective specialists expect that additional bird, small mammal, frog, snake and fish species will be found. Certain groups (e.g. fish, rodents, shrews, and most invertebrates) have not been sampled comprehensively and few investigations have been undertaken in the north of the Park containing different (dryer) habitats and vegetation. Several new species have been described from the Park (Hallermann and Roedel 1995, Werner 1995, Hoffman and Mahsberg 1996, Kaupp and Roedel 1997, Adlbauer 2000, Pederzani and Reintjes 2002, Rödel *et al.* 2002).

The degree of biodiversity, its geographical location and its large size make the CNP the most important savannah park in West Africa. It is the last refuge for several large mammal species in Côte d'Ivoire like lion *Panthera leo*, roan antelope *Hippotragus equinus*, and hippopotamus *Hippopotamus amphibius*. It contains viable populations of others that are rare or threatened throughout West Africa. It is an important refuge for several large, severely threatened mammal species such as chimpanzee *Pan troglodytes* (En), colobus monkey *Colobus vellerosus* (Vu), Diana monkey *Cercopithecus Diana* (En), elephant *Loxodonta Africana* (En), spotted neck otter *Lutra maculicollis* (Vu), lion *Panthera leo* (Vu) as well as reptiles *Osteolaemus tetraspis* (Vu) and birds *Torgos tracheliotus* (Vu), *Falco naumanni* (Vu), *Balearica pavonina* (LR / nt), *Ceratogymna elata* (LR / nt), *Neotis denhami* (LR / nt) and *Gallinago media* (LR / nt). The number of species found in the Park listed under CITES is too long to be included here.

Figure 1. *Comoé National Park, West Africa.*



In this paper, I aim to describe the situation of the park before and after the outbreak of the unrest in Côte d'Ivoire in September 2002 and discuss the effects of war on the site. The information referred to is based on personal observations made and scientific data collected during stays in the park for about 75 months between 1993 and 2002 (first as a Ph.D. student, after 1998 as the director of the Comoé Ecological Field Station of the University of Würzburg, Germany). Information concerning the situation after September 2002 derives from different sources based on personal observations from people who either live permanently at the park's border or who have visited the Park for various time periods after September 2002 and June 2004. No scientific data collection was possible after September 2002.

The situation before September 2002

The government of Côte d'Ivoire made a fine choice in setting up the national parks of the country, protecting large parts of sensitive areas in the majority of habitat types.

In the riverine human populations of the Comoé NP, however, there was a fundamental lack of understanding about why the national park was declared, what its function were, and why its future existence should be ensured. Most people believed that the existing Park animals were plentiful elsewhere and could return from there after potential local extinction. Since traditional beliefs include the possibility of using witchcraft to attract species, many people did not understand why conservationists and scientists were so concerned about the Park's situation. Even if people admitted that species were rare or about to become extinct, 'easy' solutions, like the transfer and reintroduction of animals from other parts of Africa were regularly mentioned as the best solution to the Park's crisis. Thus, a treatment for the symptoms seemed to be easy, but little thought was given to the causes of poaching and mammal decline. However, some people, mostly young, were concerned and realised that over-exploitation led to dwindling mammal populations that might not recover. Those people seemed to be rarely heard at local meetings and did not have the power and influence to convince the majority of people within the village communities, especially as they could not come up with compelling alternatives.

Since short-term financial benefits from poaching outweighed financial gain from resource management schemes, people were not easily convinced to bear conservation costs, especially as no financial support was given from outside.

Poaching

In the late 1980s, almost all management activities for the Park ceased, due to a lack of governmental and international funding (Linsenmair pers. comm.). Poaching became ubiquitous from that time onwards and led to tremendous decreases in terms of density, beginning to threaten species of larger mammals (Fischer 1996, Fischer 1998, Fischer and Linsenmair 2001). At least three species of large mammals are believed to have become extinct within the last 100 years – wild dog *Lycaon pictus*, black rhino *Diceros bicornis*, cheetah *Acinonyx jubatus* – and others are about to follow (Fischer *et al*. 2002). Since our data were based almost entirely on surveys of savannah species and very few data exist on the status of the forest-dwelling fauna, the situation might have been even more severe.

Although hunting was made illegal throughout Côte d'Ivoire in 1974, bush meat was sold openly and unrestricted on many markets, along the major roads, and in many restaurants throughout the country. A study of Caspary (1999) revealed that 35.5 million wild animals, weighing 120,000 tons, being worth 76.8 billion CFA were killed in 1996 alone throughout Côte d'Ivoire, many of those probably originating from the CNP. This high rate of offtake makes hunting highly unsustainable.

Hunting within the Park was preferred for several reasons. A poacher explained that hunting outside the Park caused more problems since it had to be permitted by village chiefs or farmers. In addition, some regions adjacent to the Park, like two zones where the World Bank GEPRENAF

Savannah in Comoé National Park, World Heritage Site, Côte d'Ivoire. Photo: Frauke Fischer.

project (Gestion Participative des Ressources Naturelles et de la Faune) aimed to start a tourist hunting site, were better protected between 1999 and 2001. These savannah sections were surveyed by the Comoé Park wardens and the villages involved in the project, making hunting there more difficult. It cannot be ruled out that poachers that formerly hunted in those regions moved to the Park. On the other hand hunting in the Park was hardly connected to any costs, since laws were not enforced.

Hunting was performed day and night and was mostly indiscriminate. Specialised elephant hunters are assumed to have turned recently to hippos (Roth *et al.* submitted, pers. observ.). Traditional hunting taboos were hardly ever obeyed, mostly due to the immigration of people from other regions with other beliefs, putting all larger vertebrate species at risk. Hunting in the Comoé National Park was performed by local villagers as well as foreigners, alone or as a group. Whereas single hunters, probably coming from surrounding villages, hunted for their own meat supply and only sold small amounts of their hunted bush meat, other hunters performed large scale commercial hunting. Village-like hunting camps were installed in the Park by the latter and used for several weeks at a time by up to 40 people (10 hunters and 30 women and / or adolescents to process and carry game). A small plantation in one camp gave it a village-like appearance, showing how secure poachers felt. Of the 180 or more cartridges we found in one of these camps, some had been modified to shoot elephant, hippo, and buffalo. Poachers dispersed from such camps for their daily hunts returning with the smaller carcasses. Larger animals were prepared where killing occurred. Whereas larger carcasses were cut up and smoked, smaller animals were often eaten in the camps. Remains of monkeys, duikers and larger birds were commonly found there. The meat was further transported by foot, bicycle or boat to the surrounding villages, either by local helpers or members of the hunting teams. In the villages bush meat was sold locally or to merchandisers. The meat was then further transported to towns and cities in the Côte d'Ivoire and to the neighbouring countries mostly by daily-run bush taxis. Middlemen in larger villages and towns, who provided hunters with torches, batteries, food and ammunition, paid for most of these activities. Cartridges, which seemed to come mostly from Ghana, could easily be purchased from travelling traders that visited villages by bicycle on a regular basis.

Hunters knew that poaching was illegal but no local enforcement existed. Certain activities like fishing, felling and burning trees bearing bee nests and killing animals without a gun were not considered poaching. The following two incidents show that poachers were not even aware of their activities being illegal. One fisherman asked scientists at the research station of the

University of Würzburg if someone could give a hint on what might have happened to the fishing nets he had installed a couple of days earlier close to the station. He had put them there on purpose, hoping that the researchers would keep an eye on his property. In another case a trapper complained to the Park's director that some other poacher had taken his traps. Since this happened within the Park he thought that it was the director's responsibility to arrest the thief in order to return the traps to the original owner.

There was a steady influx from poachers from other countries (fishermen from Mali, hunters from Burkina Faso and Ghana), who found hunting and fishing in the CNP to be either more lucrative or less dangerous than in their own countries, where law enforcement might be more efficient.

Law enforcement

For many years the 84 game wardens of the Park were poorly equipped and inadequately trained. Some game wardens were afraid to work in the bush, and feared poachers and wild animals alike. I know of one case of cooperation of wardens with fishermen (selling fishing rights for the Park) and several incidents of wardens killing animals (reptiles and fish) within the Park. In many cases, game wardens were legally absent for days, making planning difficult for their boss. Game wardens who were not motivated to do their job or refused to perform certain tasks were not fired but sent to another Park or reserve. This resulted in permanent shifts of employees. In general rapid decision making was difficult, resulting in inflexibility and low efficiency of anti-poaching activities.

In 1999 the situation improved, due to a two-year WWF project funded by the European Union. Salaries were paid regularly, equipment renewed, and a special task force of about 20 game wardens trained (see below).

In two cases, where three and four poachers respectively were actually arrested by the task force, they offered 900,000 and 1.5 million CFA in cash respectively to the game wardens (1,000 CFA = 1.75 USD). It is most likely that their wealthy middlemen provided this money. Considering the monthly salaries of game wardens ranged between 80,000 and 150,000 CFA (and 50,000 CFA reward per arrested poacher) withstanding such offers was very difficult. The cessation of the WWF project in 2001 led to a rapid decline in frequency and efficiency of anti-poaching controls with poaching increasing to former levels within a few months.

Tourism

Whereas poaching created substantial income for several people, non-consumptive alternatives, like tourism, provided close to nothing. Tourism, which had a good economic potential in the 1980s (Ruck 1990), came almost to a complete halt in the 1990s. Between 1993 and the outbreak of the rebellion, tourism existed on a very small and steadily decreasing scale of about 100–500 tourists per year. Besides the declining large mammal populations an almost complete lack of the necessary infrastructure contributed to this development. About 85% of the 1,000 km of dirt roads prevalent in the Park 20 years ago (Linsenmair pers. comm.), were more or less inaccessible in 1998, with the remaining being in bad shape due to a lack of maintenance for years.

After the only high-standard hotel in the south of the Park closed in 1992, tourist facilities comprised of a small hotel in Kafolo and two tourist camps (one very basic the other one of higher standard) in Kakpin. Adequate information about the Park was very limited in both facilities.

Tourist guides who could be hired in Gansé and Kakpin and in the hotel in Kafolo, never received any training concerning the Park and its fauna. Guides were efficient in spotting large mammals, but had little knowledge about their biology not to speak of other taxa or the ecosystem as a whole. Since tourist guides knew that people expected to see elephants and lions, they usually encouraged people when asked if the sighting of one of these species was likely, despite the fact that sightings of these animals became very rare in the late 1990s. Since these animals were

hardly ever encountered and very little other information about the Park's flora and fauna was provided, visitors often left disappointed.

International support

Despite its outstanding biodiversity, its economic potential and listing as a World Heritage Site, the international community never significantly supported the Park. The only recent initiative was the EU-founded WWF project that started in late 1998 leading to a first improvement in park management and law enforcement in 1999. A group of game wardens participated in a six-month anti-poaching training. Additionally, a surveillance camp was constructed in the Park's centre. The first positive results in reducing the poaching level were achieved in 2000. Due to this project, the road net was extended to about 400 km and was accessible in the dry season. The project was planned and executed as a transition until the implementation of the PCGAP (Programme Cadre de Gestion des Aires Protégées), a project supposed to be financed by several international donors aiming to improve the management of the protected areas of Côte d'Ivoire. EU funding was aimed to support a second phase of the project from August 2002 onwards, after an interruption between April 2001 and July 2002, due to internal processes of WWF Abidjan and the EU. Due to the outbreak of the rebellion funding ceased and the expatriate project manager had to leave the country.

The situation after September 2002

On 19 September 2002, armed groups attempted to take over the government, in a bid to gain power over the major cities in Côte d'Ivoire. While the attempted coup d'état failed in Abidjan, the northern part of the country came rapidly under rebel control, with the front line running through the south of the CNP. All expatriates in northern Côte d'Ivoire were asked by their embassies within the following week to withdraw to Abidjan and later advised to leave the country. Park authorities based in Bouna also had to leave to evade the approaching rebels.

Heavy fighting did not occur in the area nor are there reports of setting land mines. However, the number of firearms increased due to the recruitment of additional soldiers and the influx of fighters from other regions.

According to our local assistants, hunting heavily increased after our departure. While poaching incidents were rare in the direct vicinity of the station before our departure, gunshots were heard frequently afterwards. Villagers complained that the situation became increasingly insecure during the following months, including aggressive encounters with armed people of unknown origin in and around the Park. This, as well as the confiscation of all vehicles, made it impossible for our assistants to stay at the station after November 2002.

In the following months the research station was looted several times by unidentified people, inflicting a damage of approximately US$ 3 million. The situation calmed down around the Park in the course of 2003. Today, international peace keeping troops as well as French troops, are stationed in the area, but management of the Park has not resumed (July 2004).

Effects on wildlife

During our presence, our study area (ca. 200 km^2 in the vicinity of the station) contained a high abundance of wildlife, with animals being less shy compared to those in other parts of the Park. After our departure, poachers hunted intensively in this area, targeting the largest ungulates first. Presumably this had the most severe impacts on buffalo *Syncerus caffer*, roan *Hippotragus equinus*, hartebeest *Alcelaphus buselaphus* and waterbuck *Kobus defassa*. According to local people, these species were preferred since they showed the closest resemblance to domestic cows that were otherwise the preferred source of meat. Another species that has been reported to suffer heavily from increased poaching is the kob antelope *Kobus kob kob*, which can easily be hunted at their drinking sites.

These observations are corroborated by the fact that initially commerce and trade were heavily disturbed as an effect of civil strife. People, especially in the south of the Park, lost access to the markets which might have forced some of them to increase hunting activities in the Park. On the other hand, some people might have been reluctant to enter the Park, fearing encounters with armed forces.

Villagers as well as people who visited the Park on several occasions in 2003 and 2004 reported to me that poaching had reached extremely alarming levels. The quantitative effects of this can only be evaluated after resumption of the scientific large mammal counts and comparison of the new results to earlier data (Fischer and Linsenmair 2002). However, I am afraid that all larger mammal species suffered tremendously. Their population densities were already low before the rebellion making them extremely vulnerable to even small increases of poaching activity.

Conclusions

Nature conservation in Africa shows a comparatively good cost-benefit-ratio (Balmford *et al.* 2003), with good results for relatively modest financial input. On the other hand, political instability in several African countries make conservation and scientific efforts a risky business, at times with the potential of total loss of investments.

In this article I sought to address two problems. First, the lack of international and local funding for an efficient peacetime management of one of West Africa's most important biodiversity sites, and second the devastating situation of the CNP in times of war.

Despite the importance of the CNP hardly any international support has been given to it for the past 20 years. Even though the CNP is West Africa's largest savannah park, playing an important role for the entire region due to its ecosystem, goods and services, the international community has substantially overlooked it. This World Heritage Site contains an extraordinary biodiversity, including several threatened rainforest species (which almost completely lost their rainforest habitat further south) as well as endemics.

River Comoé, Comoé National Park, World Heritage Site, Côte d'Ivoire. Photo: Frauke Fischer.

The situation in the CNP supports the assumption stated by Dudley and his colleagues that armed conflicts today do not lead to war zone refuges, but generally have very negative effects on protected areas (Dudley *et al*. 2002). If any war zone refuge effect occurred, it did so only in the first months of unrest and was minimal compared to the later devastating effects.

Important next steps

Due to the inaccessibility of the CNP at the moment, scientific data on the effects of poaching are lacking. However, the anecdotal evidence on its increase is disturbing. An international mission to the Park should be undertaken as soon as possible. Such a mission, which is in the planning process at IUCN and UNESCO, should aim to evaluate the present situation as well as showing international interest in the site. An agreement should be negotiated as soon as possible with all political parties in Côte d'Ivoire to agree on the protected status of the Park. Giving conservationists, park staff and scientists free access to it, maybe even supported by an international 'green helmet unit', is an urgent matter.

After securing free access to the Park, the poaching problem has to be addressed and hunting within the Park at least significantly reduced. Unlike other national parks in Africa human impact on the Park in other terms is extremely low. There is no human encroachment, no livestock keeping, no illegal plantations, or any logging activities.

Strong and efficient international support is urgently needed to save the Park. Its inscription on the World Heritage Sites in Danger List in July 2003 should be helpful in terms of getting this support. If immediate and serious action is taken the chances are good that the future existence of the Park and most of its fauna and flora can be ensured. Awareness should be raised for the importance and uniqueness of the Park on a regional, national and international level trying to raise pride for its existence. The fact that some officials often saw the pointing out of the severe problems of the Comoé to a larger (international) audience as an unpatriotic act, put conservationists in a complicated dilemma, which has yet to be solved.

Looking further ahead

Due to its size, the potential for wildlife / human conflict around the Park is minimised. The CNP is the only potential site in West Africa large enough for the reintroduction of a viable population of African wild dog *Lycaon pictus*, a species that was eradicated here in the 1980s (pers. obs., IUCN 1997). According to its size and habitat, the Park would also be a suitable site for the reintroduction of black rhinos *Diceros bicornis*. The second largest West African savannah elephant populations (about 1,000 animals), occurring about 100 km east in Ghana's Mole NP (Blanc *et al*. 2002), does not have access to the excellent elephant habitat in the CNP at present. The connection of these two Parks (and potentially other sites in Burkina Faso) would create a West African trans-frontier conservation area, with all the concomitant ecological and economic benefits for the participating countries. In fact, the presumed ecological effects of political unrest described here would not have been as severe if a trans-frontier protected area had existed already. The Park is also one of the three MIKE (Monitoring the Illegal Killing of Elephants) Sites in Côte d'Ivoire and should be surveyed for its remaining elephants as soon as possible. According to leading primatologists the Comoé is also a very important site for the conservation of the Western chimpanzee (Kormos 2003). Additional importance of the Park derives from its function as a green barrier for the Sahara encroachment.

Several scientists working at the research station of the University of Würzburg have collected important and abundant baseline data to evaluate the Park's situation, which probably makes it one of the best studied ecosystems in West Africa. This will be of great help for future conservation projects.

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parks

Recovering from conflict: the case of Dinder and other national parks in Sudan

WOUTER VAN HOVEN AND MUTASIM BASHIR NIMIR

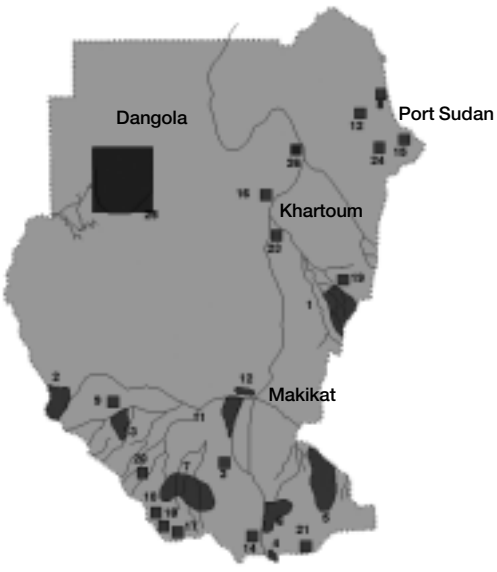
Protected area management in Sudan has been neglected due to the prolonged civil war. The country has six national parks, thirteen game reserves and three nature sanctuaries. Although Dinder and Radom National Parks are also declared Biosphere Reserves, the design and management principles for this designation have not been implemented and no management plans for the protected areas exist. Most wildlife species in Dinder National Park have declined by about 80% during the past 25 years. The Park is 10,000 km^2 in size, has an annual rainfall of 600 mm and is the most northern region of Africa where roan antelope, Cape buffalo, elephant, warthog, kudu and lion are found. This Park is the only one in Sudan where some management and protection takes place. Three hundred tourists visited the Park in 2003.

Key words: Sudan, Dinder National Park, biodiversity, local communities, natural resources, law, ecology.

THE HISTORY OF PROTECTED AREAS IN SUDAN has been closely linked to the historical and political evolution of this country, the largest on the African continent. The area of Sudan is 2.5 million km^2, with a human population of 33 million, comprising 132 tribes and numerous sub-tribes that speak a total of 150 different languages. The war in southern Sudan is the longest civil war in Africa, still continuing after more than five decades. Causes of the war in southern Sudan are deeply rooted in the colonial policies of concentrating development projects in the north and discouraging the integration of the people of the North with the black tribes of the South. The civil war has spread since the 1980s from southern Sudan to the Nuba Mountains, Blue Nile, Kassala and Dar Fur State.

The civil war in Sudan can only be explained as conflict over natural resources. When Africa was carved up by the colonial powers, cultural divides and ecosystems were not taken into

Figure 1. *Game reserves and national parks of Sudan.*



Key:

National parks:
1. Dinder
2. Radom
3. Shambe
4. Nimule
5. Boma
6. Badinglo
7. Southern
8. Sanganeb

Game reserves:
9. Ashana
10. Bengangai
11. Ez Zeraf
12. Sheilko
13. Fanikang
14. Juba
15. Tokor
16. Sabaloka
17. Mabarzingo
18. Birkabtos
19. Er Rahad
20. Numatinna
21. Kidepo

Sanctuaries:
22. Erkowit Sinkat
23. Khartoum
24. Erkawit

New national parks:
25. Wadi Howar
26. Jebel Hassania

account, the result of which still negatively affects Africa today. The Sudan that the British ruled was more like two separate countries. Issues of ethnicity are obvious as people of African origin dominate the southern, western and eastern Sudan, while those of Arab origin live in the north and centre of the country. The civil strife is primarily due to conflicts over access to resources, power and governing structures (not necessarily at central government level) and fueled over the years by cultural differences, ethnicity and religion (Abu Sin and Takana, 2001). The Sudan, rich in biodiversity, also exhibits a diversity in soils and water resources, mainly from the Nile, which extends 2,258 km from the south to the north. Rainfall varies from zero in the north to 1,200 mm per annum in the south. These variations in natural resources imply differences in economic potentials, leading to contrasting abilities to utilise resources which again has further generated regional and hence ethnic inequities and conflict.

The northern part belongs to the Sahara and has many ancient pyramids and cultural treasures; it includes trade centres such as Omdurman, Khartoum and Port Sudan and thus has more wealth. The southern part is totally different, comprising of black African tribes such as the Dinkas, Azandes and the Nuers; it has a tropical climate with rainfall above 800 mm per annum and is poor and undeveloped. The British succeeded in maintaining a level of peace while developing the country, yet civil war erupted even before independence in 1956 and the north and the south are still at war today. There are four million war refugees in Sudan, mostly coming from the south – more than twice as many compared to any other country in the world.

The 1993 population census revealed a new social phenomenon, which has important social and gender implications – namely that about 25% of all households are female-headed. The marital status of these female heads of households shows that 14.4% are married, 44.4% are widowed, 39.4% are divorced and 1.8% never married.

The civil war has resulted in the neglect of management and protection of protected areas. The impact of the civil strife was not only restricted to the war area but triggered migrations of people and livestock to the northern parts of the country and thus increased the pressure on the natural resources in these areas.

Twenty-four areas are gazetted and declared protected areas and an equal number of areas are proposed. Some of the areas were gazetted as long ago as 1935, while others were recently established. However, the civil war is having a serious impact on wildlife and protected areas throughout the country. Only a few of the protected areas have game scouts present (outposts) and occasional patrolling, or marked boundaries and some tracks, while most of the protected areas exist on paper only. Darling (1961) noted that the reserves system as a whole had been quite inadequately staffed. Hashim and Nimir (1978) remarked that the Wildlife Administration had done very little to enforce conservation in protected areas and reported that all protected areas in the Sudan had experienced serious deterioration of wildlife and their habitats.

All protected areas in Sudan are managed without documented management plans. Although a management plan was developed for the Southern National Park, it was not implemented due to the war. In spite of the declaration of Dinder and Radom National Park as Biosphere Reserves in 1979 and 1982 respectively, no measures were taken to implement the MAB (Man and the Biosphere) concepts.

The Sudan Government is showing strong commitment to wildlife and protected areas as is reflected in the signing of international and regional agreements such as the African Convention on Biodiversity, World Heritage Convention and the Convention on Biological Diversity. The network of gazetted protected areas have been subject to only one case of cancellation of a game reserve, the Rahad Game Reserve being degazetted in 1994. However in times of civil war, with the displacement of millions of citizens, the mere logistics of administering a country becomes very challenging and limited state funds must give first priority to feeding the war effort. For now, nature cannot expect more protection from government.

Dinder National Park

Dinder National Park is one of the older protected areas in Africa. It was established in 1935 following the London Convention on the conservation of African flora and fauna held in that year. Dinder NP is situated in an area bordered by three states, Sennar, Gedarif and Blue Nile, but administratively falls under the State of Sennar. The Park is marked in the north by the Rahad River at Lat. 12°26'N and Long. 35°02'E, which continues in a north-westerly direction up to Long. 35°32'E along Khor Kenen and then the boundary slightly diverts to the southeast to Lat. 11°55'N and Long. 34°44'E, before connecting with the Sudan-Ethiopia border.

Human settlement in the Dinder region dates back at least several centuries and the British explorer Samual Baker found the Dinder area fairly heavily populated in 1861 (Ali, 1986). During the late 1880s a large emigration from the area took place due either to the great famine of 1888 or to further support the Mohdist revolution of those years. When the explorer Harrison wandered into the present Park area 37 years later he found only traces of earlier human settlements (Mohammed 1999).

However, resettlement of the area intensified in the early 1960s through immigration from western Sudan and West African countries because of famine and constant, severe droughts of the 1980s (Suliman 1986). A large number of these immigrants have settled along the banks of the Rahad and Dinder Rivers. Many different tribes came to the area: Masaleet, Burgo, Dago, Fellata, Houssa, Salaheb, Haloween, Rezaigat and many other smaller tribes. Nomadic pastoralists have also been attracted by the area, where they remained during the dry seasons to utilise the available water and grazing resources.

Two factors accelerated the influx of human population into the Dinder area. First, the unplanned and uncontrolled expansion of mechanised rain-fed agriculture that created a good market for wage labour, thereby attracting increasing numbers of workers who settled seasonally or permanently in the vicinity of the Park (El Moghrabi and Abdu, 1985). The second factor is the Land Registration Act of 1905, which states that all land, with few exceptions, belongs to the public. Consequently, the native administration and tribal leaders, as means of consolidating their own

Figure 1. *A part of the lush wetlands in Dinder National Park. Photo: Wouter Van Hoven.*

powers and authority and to extend their influence over their respective domains, distributed traditional agricultural lands to migrants and encouraged them to settle in the area. Bearing in mind that Sudan has about 130 million-head of livestock, the bulk of which migrate with the nomads in search of grazing, it is not surprising that the Sahara Desert is expected to spread. The theory of desert creep from north to south is no longer acceptable. Based on evidence using satellite imagery, desertification is seen to occur from water points spreading out widely due to overgrazing and intensive use. Such areas could be located deep within the low rainfall savannah.

From the air Dinder National Park looks like a green oasis surrounded by overgrazed arid areas that are constantly under pressure from nomads and refugees for the grazing.

The consequences of these two factors have led to more human population influx and new villages continue to spring up. When an additional area of 2,630 km^2 was annexed for inclusion in the Park in 1983, bringing the total size to about 10,000 km^2, some of the villages became located inside the Park and others ended up close to its new boundaries.

The decline

The ecosystems and biodiversity of Dinder National Park face many problems and threats. These all relate to various activities by the communities living within and around the Park and also by those living in nearby towns.

Mechanised and traditional rain-fed farming

Both mechanised and traditional rain-fed farming are causing a lot of ecological damage, mainly to the migrating wildlife species. When animals migrate into their natural wet season habitat, they are now regarded as intruders and shot. This is one reason why the populations of tiang, Roan antelope, waterbuck and reedbuck have declined drastically. The meat of the animals that are killed is used for feeding farm labourers.

Hunting and poaching

Illegal hunting inside the Park is a common activity both in the wet and dry season. In 1969, the community of Bandagheu poisoned a waterhole in the Park. As a result, several hundred animals were killed in order to make biltong for sale (Dasmann, 1972). Several game scouts have lost their lives at the hands of poachers in the park, primarily commercial bush meat poachers that come on camels.

Fishing and honey collection

The species of fish available in these mayas are 'gormut' *Claris lazera*, 'nok' *Heterotus niloticus*, 'gurgur' *Synobipos* spp. and 'bulti' *Tilapia nilotica*. These fish are sold in dried form at local markets. Most of the dried fish is bought by wealthy merchants and farmers for feeding labourers during the rainy season.

Honey collection starts in the dry season, usually in the months of January to March. During this period, the Park's personnel report many uncontrolled fires started by poachers and honey gatherers.

Tree felling and wood collection

Cutting of trees, either whole or parts of trees, is a common activity in and around the Park. The local communities cut trees for many reasons. Trees may be cut for poles used in building huts, or branches that are out of reach of goats and camels are cut for browsing livestock. Trees are also cut down for the production of charcoal. Because of this, the trees in the area around the Park have been reduced to shrubs. The species of trees targeted are all species of *Acacia* and *Balanites*.

Non-wood products

Several main non-wood products are utilised by the communities in and around the Park. The first is 'saaf', the young leaves of the dom palm tree. These are used for making mats, baskets, honey pots and handicrafts. Some of the manufactured items are for household use and some are sold commercially. Saaf also has social functions and is of symbolic significance, being woven and tied around the hand and leg. It is perceived as a protection for wives and circumcised girls against evil eyes. It is also used to protect corpses from rotting until burial can take place.

Other non-wood products include fruits and other special parts of both plants and animals that are used for food and medicinal purposes. The wild fruits that are eaten include the dom palm, 'Nabag' *Ziziphus* spp., 'Lalob' *Balanites* and 'Tebeldi' *Adansonia digitata*. Some are sold in the local market centres.

Before the massive immigration of human population to the Dinder area, directly and indirectly due to the war, the National Park was reputed to have contained rich biodiversity. However, the animal species populations in the Park have been greatly affected by the activities of the communities living around and inside the Park. Although the vegetation inside the Park is in good condition, the populations of larger animal species are declining fast through poaching by individuals from the local communities and even more severely by armed commercial poachers. Since the establishment of DNP, some wildlife species have disappeared from the Park. These include elephant *Loxodonta africana*, black rhinoceros *Diceros bicornis*, hippopotamus *Hippopotamus amphibious*, tora hartebeest *Alcelaphus buselaphus tora*, giraffe *Giraffa cameleopardalis*, Soemmering's gazelle *Gazella soemmerringii* and the Nile crocodile *Crocodilus niloticus*. Species like tiang *Damaliscus lunatus tiang*, Bohor reedbuck *Redunca redunca*, greater kudu *Tragelaphus strepsiceros*, bushbuck *Tragelaphus scriptus*, red-fronted gazelle *Gazella rufifrons*, oribi *Ourebia ourebia*, roan antelope *Hippotragus equines*, African buffalo *Syncerus caffer* and waterbuck *Kobus ellipsiprymnus defassa* have been drastically reduced in numbers. Small groups of lions are still present in the Galagu region.

Before and after the independence of 1956, no efforts were made to census the animal species in the Park on a systematic basis. However, Minga (1971) made counts on nine of the main mayas (meadows) of the park. He counted a total of 5,613 large game animals during the period of March–April 1971. Dasmann (1972), Abdel Salam (1985), Abdel Hameed *et al.* (1994), Kual (1989) and Kano (2000, 2001) conducted road and maya counts in the Park. Even though the methods of counting were not the same in objectives as well as methods and extent of coverage, their efforts are worth mentioning.

To visualise the trends of animal population dynamics in the Park during the past years, Dasmann's road counts have been chosen as a benchmark for comparison with those subsequently recorded by other researchers. According to Dasmann (1972), the most common animals in the Park were warthog *Phacochoerus africanus*, reedbuck, oribi, tiang and waterbuck. Using the figures in combinations between 1972 and 2001, reedbuck has declined by 72% to an estimated 33,400, oribi has declined by 68% to 7,400, waterbuck by 85% to 1,500 and tiang is rarely seen in the Park today but were estimated at 9,200 in 1989. In March 2003, we counted a breeding herd of buffalo of just over a hundred individuals which, in 1989, Kual had estimated them as 6,000. Roan antelope are estimated at 760 lately, greater kudu at 1,500, red-fronted gazelle at 650, bushbuck at 2,000 and warthog at 13,000.

Most of the mayas, which maintain the animals in terms of water and grazing resources, have been silted and have become dry. Some of the mayas feeder streams have been blocked, resulting in some of the productive meadows not receiving water directly from the Dinder River or from Khors Galegu and Masawik. Maintenance with a bulldozer would solve the problem.

As far as the tourism industry is concerned, the Park has very little infrastructure developments to attract tourism. Therefore, DNP is not well known both on the national level and the international level. Despite the lack of infrastructure and accommodation about 300

tourists, both resident and expatriate, annually visit the park in the dry season. During 2003 comfortable up-market chalets and an education centre with dining facilities were completed at Galagu, the main camp.

Recovering in times of civil war

The President declared a new national park to be established in Wadi Howar in 2001. The Wadi Howar National Park will be the first desert park in the Sudan and it is proposed to be an area of 100,000 km^2, and will be one of the largest parks in the world. The current protected areas amount to about 4% of the area of the Sudan. The National Comprehensive Strategy 1992–2002 stated that protected areas should be increased to 25% the area of the Sudan.

Many good intentions for the conservation of Sudan's natural resources have been tabled and many sound laws have been passed – but the resources to implement these laws and improve the socio-economical status of the people is wasted on a civil war costing US$ 1 million per day. Unfortunately, you cannot teach conservation to hungry people nor have people respect borders under conditions of war.

The demand for natural resources is increasing world wide, especially in tropical countries with fast growing human populations. As a result many national parks, like Dinder National Park, are subject to various outside influences. To survive these external pressures, DNP should be managed in ways that bring real benefits to the local communities.

DNP can bring many valuable benefits to the communities living nearby by allowing them to make use of several species of wild plants and animals for food and traditional medicines in a sustainable way. Training and employment in the hospitality, nature conservation and law enforcement sectors could also have a local focus.

The institutional framework

The Wildlife Administration has undergone various changes, also regarding its attachment to several ministries. Since 1992, it has been part of the police headquarters under the Ministry of Interior, after the unification of various police forces, military and para-military units.

The Ministry of Interior is not the ideal place for wildlife conservation because the Ministry has many other functions and priorities and wildlife management is something new to them. As a result, no budget has been provided for Wildlife or Protected Areas since 1992. Before 1992, when wildlife was not joined to the police forces, the Ministry of Finances and Economics provided the major part of the wildlife budgets, including that of Dinder National Park.

After the unification, with no budget allocated to the Park, it now fully depends on a 50% share obtained from the sale of confiscated livestock found in the Park. It is perhaps understandable that in a country under civil war for so many decades a 'wildlife force' with a General at its head is responsible for protected areas.

The management plan for Dinder National Park

The wildlife and ecology

Based on the decline of much of the wildlife, the disappearance of certain species and the overall threat to all species in the Park, as discussed above, an integrated management plan was completed in early 2004. The HCENR of Sudan has applied for a grant from the Global Environment Facility and this grant is being managed by the UNDP office in Khartoum.

In addition to the HCENR, several other organisations are working together as a team, including the Wildlife Force (part of the police force under the Ministry of the Interior), University of Juba, University of Khartoum, the Centre for Wildlife Management at the University of Pretoria in South Africa and the Wildlife Research Center in Khartoum.

The management plan focuses on the principles of a Biosphere Reserve, as this is also the status of Dinder National Park and also the principle of Wilderness Areas as defined by the

Wilderness Task Force within the IUCN. Sufficient biological, climatological, geological, legal, economic and social information has been gathered on which to base the management plan. Capacity building to implement, manage, monitor and administer this park is emphasised. Further guidelines deal with the management of the mayas and pools, zonation of the park, anti-poaching patrols, removal of invasive species of plants, range improvement, fire management, re-seeding and reforestation initiatives, watershed management, and improvement of roads and tourism infrastructure.

The local community

More than 150,000 villagers live in the vicinity of the Park in over 50 villages in the three states. The project initiated activities with the local communities in 2001 in Gedarif and Sennar states and March 2003 in the Blue Nile State. Based on the results of these surveys, the project launched environmental and health awareness campaigns in 35 villages in association with the Sudanese Environment Conservation Society (SECS). These activities culminated in the establishment of Village Development Committees (VDCs) in 23 villages. Capacity building in the communities became the focus through training activities with emphasis on problem identification, project cycle and simple feasibility studies.

The project used a revolving fund of US$ 75,000 to finance activities applied for by the VDCs. The philosophy behind the revolving fund is to provide local communities with alternatives and incentives to decrease their dependence on the natural resources of the Park. The VDCs have formulated the criteria of the sub-projects, the finance type of individual and communal programmes and the ceilings of finance. Accordingly about 68 sub-projects divided into 21 different activities have been financed from the revolving fund. The sub-projects included provision of agricultural credit, apiculture, food banks, animal husbandry, and decreasing the use of fuel wood and charcoal through provision of butane gas cylinders and gas stoves.

Figure 2. *A new agro-forestry project on the border of the National Park decreased the dependence on natural resources inside the Park. Photo: Wouter Van Hoven.*

More than 60% of the total amount of the revolving fund was channelled into the communities up to June 2003. Most of the VDCs have entered a second and a third phase of re-financing and the benefit is slowly spreading to the communities. This activity, in addition to the awareness and training activities, has improved the previously strained relations between the communities and the Park and created better understanding about the importance of the Park among the communities. This has been manifested in the reduction of trespassing and violations by villagers in the Park.

Foreign aid

The European Union suspended official development assistance to Sudan in 1990 because both the Sudan Government in the north and the Sudanese Peoples Liberation Army (SPLA) in the south tried to establish leverage over donor activities (Higazi, 2003). The Khartoum Government formed the Humanitarian Assistance Committee (HAC) to control donor programmes in the north and the SPLA formed the South Sudan Relief and Rehabilitation Association (SRRA) to do similar work in the south. The humanitarian aid was badly needed to assist rural communities and thus lessen their dependence on natural resources, especially in protected areas. An agreement whereby the SPLA would be able to levy taxes on humanitarian activities, which include the hiring of personnel, tax relief flights and veterinary aid programmes was unacceptable to most humanitarian aid agencies, resulting in their eviction from southern Sudan. This made the protected areas even more vulnerable. The European Community Humanitarian Aid Office (ECHO) finally came to a revised agreement with the SPLA and since 2002 resumed supporting humanitarian needs in southern Sudan (Higazi, 2003).

Conclusions

Prolonged civil war in a country refocuses national priorities as well as financial resources. Ordinary law enforcement becomes diluted and in the case of Sudan has resulted in more than four million refugees and an increase in nomads. The protected areas have become attractive havens of natural resources and insufficient law enforcement led to unsustainable use of grazing by domestic stock and serious poaching.

With the support that the local communities on the edges of Dinder National Park are now receiving, natural resource dependency in the Park has declined significantly. The government has become more committed to wildlife conservation and with the implementation of the new Integrated Management Plan for Dinder, the future of protected areas in general in Sudan may have a second chance.

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parks

Threats to Nepal's protected areas

PRALAD YONZON

Nepal is a remarkably diverse country, with habitats ranging from lowland forest to ice-covered peaks. Even though the country has a large number of people living in absolute poverty, the government has made a substantial investment in protected areas, covering about 19% of the country's land area. However, in the past several years an insurgency movement has threatened many of these protected areas, leading to increased poaching of rhinos, destruction of protected area infrastructure, and poaching of timber for export to India. A concerted international effort is required if the protected areas of Nepal are to maintain the values for which they were established.

NEPAL'S BIOLOGICAL RICHES are different than its economic and development fronts, which are characterised by subsistence agrarian regimes, skewed land distribution, and an uneven distribution of income, with 40% of the population living in absolute poverty. Nepal covers an area of 147,181 km^2, and collectively administers its local governance through 75 district development committees (district level), 3,913 village development committees (village level), and 58 municipalities (town level).

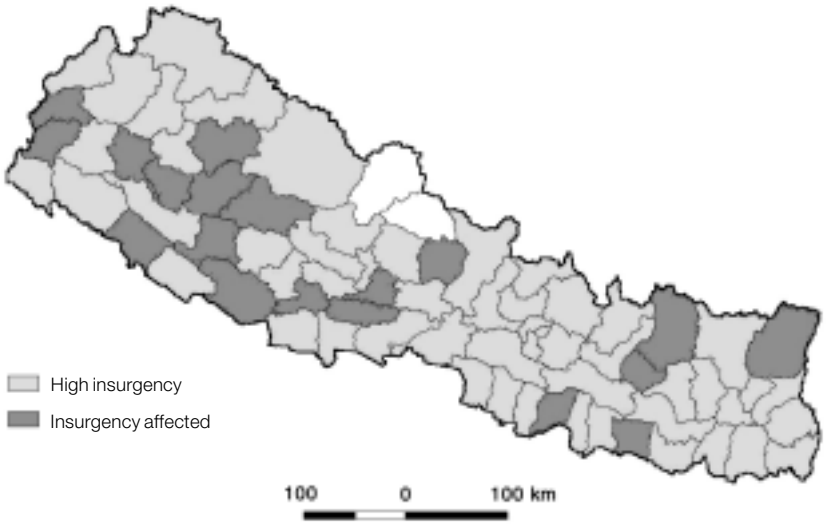
The 1990 Constitution of Nepal guaranteed a multi-party democracy. The United People's Front became the third largest party, which split into two in 1994. In 1996, the Communist Party of Nepal (Maoist), the first splinter group, then organised its own political and military fronts to renounce the parliamentary system. The Maoist movement in Nepal is intertwined between social and economic issues, produced and sustained by failed development (Pandey, 1999). By 2003, the insurgency has destroyed six district development committees (DDC) and 752 village development committees (VDC). Some 9,000 people lost their lives in the conflict, and over 65,000 have fled from their homes. This is an enormous cost on biophysical, human, economic, cultural and social sources of capital (Dyer and Poggies, 2000). These losses signal the beginning of a void in community-based conservation in managing common property resources. This paper describes the threats to Nepal's protected areas and forests and suggests that civil conflicts are a major threat to biodiversity at a time when conservation is far from secure (Yonzon 2002).

Insurgency, forest loss and encroachment

Nepal's biodiversity is sustained in five key categories: forest, wetland, rangeland, agriculture biodiversity and indigenous livestock (Yonzon, 1999). Forest includes protected areas, community forests and non-timber forest products. However, Nepal's forest cover has decreased from 37.4% to 29% (DFRS, 1999) – representing the loss of some 12,353 km^2 of forests. Despite having 74 district forest offices, 92 forest area offices, and 698 range posts under five different administrative regimes, forest degradation continues. Loss of forest cover is complex because encroachment and illicit tree felling are intertwined with local politics, state machinery, timber lobby groups and smugglers. In this context, damages to forests are further aggravated by the insurgency. According to an unpublished Department of Forest report, the Maoists have destroyed nine (7%) district offices, 33 (31%) area offices and 142 (21%) range posts until 2002. This destruction continues (Tamrakar, 2003) (see Figure 1, over). Forest field staff and their offices have been shifted to safer locations, such as district headquarters areas, which have enabled timber smugglers to cut down more trees. Likewise, several donor-aided forest projects have been abandoned due to the fear of armed attacks. Insurgency has brought more illicit tree felling and timber smuggling, leading to many long-term implications of both environmental degradation and lost conservation opportunities.

Community forests and conservation areas are the most drastic examples of forest management regimes that have progressed from the state to communities, ensuring protection of rights, bearing responsibilities and sharing of benefits. In this regard, it is important to note that

Figure 1. *Levels of insurgency in the district forests.*



community forestry has sustained management practices in nearly 10,000 km^2 of forest (Sharma, 2002) which is almost double than the total forest cover (5,827 km^2) in the protected areas (PAs) of Nepal (Resources Himalaya, 2001).

The negative impact of insurgency has been so profound that it is difficult even to guess the extent of damage to all the sources of capital that maintain biodiversity and agriculture production. Although a thorough analysis has not yet been done, a large proportion of the 12,584 community forest user groups benefiting 1,406,947 households may have experienced different levels of management stress and/or crisis from insurgency. On the one hand, a few reports suggest that insurgency has reduced excessive pressure on forest or halted timber exploitation. On the other hand, the insurgents in some districts, particularly Kailali, have started to collect over 50% of the revenue generated through community forestry. The continuing policy-level scuffle as the government promulgated an ordinance to collect 40% of the income from all community forests in 2003 has further complicated this issue. Moreover, it is not only insurgency that threatens forest but also communities living near forests who have encroached about 700 km^2 of forest land during the insurgency. Over all, insurgency and its spin-off processes have devastated Nepal's human resources and their productivity, with many forms of community impairment in the conservation of biodiversity.

Insurgency issues in protected areas

If the centerfold of Nepal's biodiversity is forest, then its nucleus is the kingdom's protected area system because it embraces all five key categories of biodiversity. Nepal has 16 protected areas, covering 27,083 km^2, about 19% of the country's territory. The protected areas are managed by the Department of National Parks and Wildlife Conservation (DNPWC). Maintaining these key protected areas where surrounding land use patterns tend to change rapidly requires participation of the people as well as investment to safeguard ecosystem integrity. As one response, in 1975, the forest guards in protected areas were replaced by army units. At present, three infantry battalions and nine independent infantry companies comprising about 4,409 army personnel are protecting eight national parks and three wildlife reserves. Managing PAs with the involvement of the Royal Nepal Army has been widely discussed for its maintenance cost and efficiency (EPC, 1993; Sharma and Wells, 1996), and has both strengths and weaknesses.

Not all PAs have army units assigned to them. Of the 16 PAs including their buffer zones (covering 27,083 km^2) in Nepal, Annapurna, Makalu-Barun, Manaslu, and Kanchenjunga do not have army presence because strong community-based initiatives make them unnecessary. Also, the army is not posted in Dhorpatan, a hunting reserve for blue sheep.

Some 41 damaging insurgency events have occurred in PAs, with the most in Annapurna (24%). Suklaphanta, Rara and Shey Phuksundo had 12% of each (Figure 2). Four distinct insurgency patterns occur in PAs:

1. disturbance incidence is high among community managed conservation areas;
2. disturbance incidence is better controlled in national parks where army postings are high;
3. protected areas in west Nepal are especially targeted and attacked; and
4. the incidence of insurgency in PAs is not yet contained.

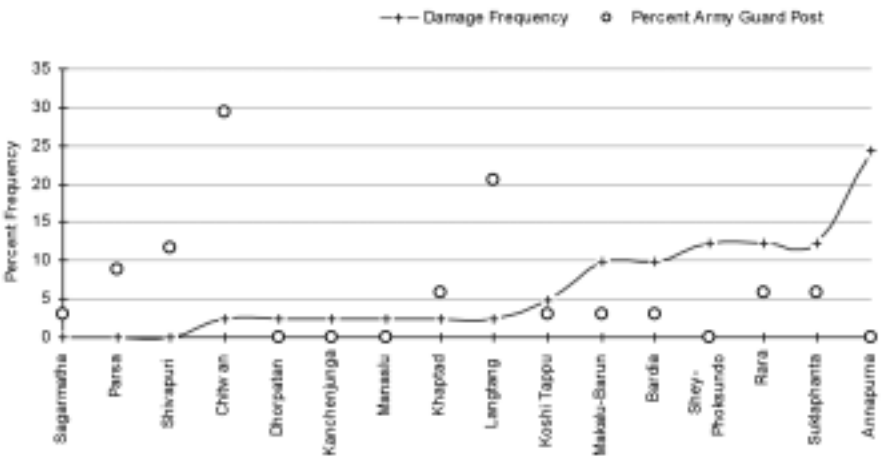
In those PAs where army posts are absent (three conservation areas, one national park and one hunting reserve), insurgents have trained their cadre on warfare. In Makalu-Barun, they extort $50 from each foreign visitor. Therefore, army presence is a significant deterrent factor, though they consume about 75% of the budget of the DNPWC (EPC, 1993; Wells, 1994). Bardia and Suklaphanta in west Nepal are used by the insurgents as bases and escape routes into India, posing particular problems for both the army and DNPWC.

Although the number of army personnel has remained about the same as before, their strategic placements in each PA has significantly declined for the following reasons:

1. security forces are sparsely deployed over large areas;
2. military operations in mountainous terrain provide numerous logistical challenges; and
3. the essentially open border with India makes it difficult to control insurgency.

Therefore, the army needs to reinforce its presence to enable the protected areas to prevent further attacks from insurgents. To illustrate the impact of the insurgency, the protected areas previously had 112 guard posts (average: 10.18 troops; range: 3–34) but now have only 34 (average: 3.04 troops; range: 1–10) – an alarming reduction of 70%. This configuration has opened a whole new world for poachers and smugglers. Where guard posts have been abandoned within

Figure 2. *Percentage of army posts and frequency of insurgency-related damages.*



protected areas, poacher and loggers have found new opportunities to exploit resources that are owned and valued by the entire population of Nepal; public goods are being extracted by illegal private interests.

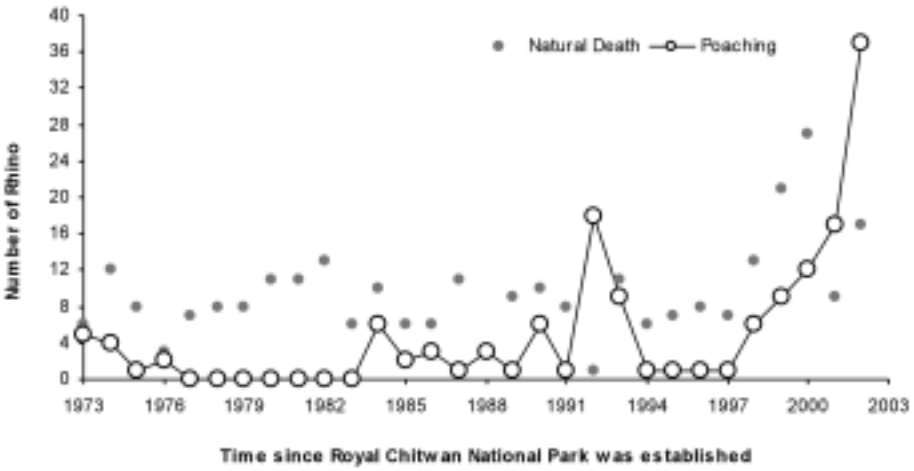
Insurgency is insignificant in Chitwan National Park (established in 1973) but poaching has suddenly become a major problem. Some 37 rhinos *Rhinoceros unicornis* were killed by poachers in 2002. Combining all data from various sources including annual reports of the Department of National Parks and Wildlife Conservation on rhino mortality, poaching appears epidemic. Likewise, 48 natural death records were reported in 1999–2000. This event cannot be explained in the light of population dynamics as no epidemic was reported during those years (Figure 3). A large die-off of such a nature is considered unusual. Perhaps some were injured with gunshots, who survived for a couple of days and their skeletal remains were found later with obscured evidence of poaching. These incidents may also be associated with failures of intelligence-gathering on poaching (Adhikari, 2002). Chitwan generates nearly US$ 0.6 million each year from tourism revenue, of which 50% is passed on to the buffer zone development committee, governed by 37 user group committees representing 36,193 households. As wildlife brings benefits, rhino poaching should be held in check by these communities as well, who enjoy a major share of the Park revenue. Likewise, reports on smuggling of timber to both Indian states and bordering areas of Tibet have measurably increased.

Conclusion

Nepal may learn some important lessons from the African and Latin American conflicts (McNeely, 2000) but the general prescriptions of good science and clean politics need to be applied with considerable local sensitivity. While insurgency has facilitated both poachers and timber smugglers with unknown effects on biodiversity, many state-sponsored organisations (both community-based and non-governmental) have shown that they are ineffective in dealing with the problem posed by civil conflict. The inability of these 'sponsored' grassroots signal that

Figure 2. *Wildlife Viewtower in Suklaphanta destroyed by the Maoists. Photo: Resources Himalaya Foundation.*

Figure 3. *Loss of rhinos in Chitwan through poaching.*



they cannot cope as they bear both bureaucratic entrapment and political stigma. Therefore, to address the broader issue of insurgency connected with forest-dependent communities, degradation of natural resources, and threats to protected areas, the state together with developed countries as donors must bear a greater responsibility towards diverse societies and communities who are deprived of freedom of choice and mainstream development (Sen, 1999).

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Tayrona National Park, Colombia: international support for conflict resolution through tourism

JENS BRÜGGEMANN (GERMANY) AND EDGAR EMILIO RODRÍGUEZ (COLOMBIA)

The Tayrona National Park is located on the Caribbean Coast of Colombia. The different conflicts about land use and occupation have been addressed by the ecotourism policy of the National Park Administration UAESPNN. This paper shows how international support in the application of the preliminary version of the CBD-Guidelines on Biodiversity and Tourism Development helped this process.

THIS PAPER HAS BEEN PREPARED IN MEMORY OF MARTA HERNÁNDEZ, Director of Tayrona National Park, who was assassinated in her own house in the city of Santa Marta in January 2004. The assassins are unknown and have not been caught.

Marta participated actively in the workshop on the draft international guidelines of the CBD on Biodiversity and Tourist Development and their application. She was a co-editor of the workshop report published by the German Federal Agency for Nature Conservation (BfN). Her three and a half years heading Tayrona National Park marked a new way of using ecotourism as a means to generate benefits for the local community and to lessen conflicts with those who still own land inside the Park's borders.

The assassination of Marta Hernández is an expression of a violent conflict in Tayrona National Park which in turn is a reflection of the historical and complex problems faced by the Colombian nation as a whole. This includes the upsurge of guerrilla movements and paramilitary groups as well as the relative weakness of state institutions in some, mainly remote, areas and regions of the country. This does not mean, however, that these conflicts always and at all times involve violence with combat, kidnapping and assassinations.

Marta Hernández (left) and other participants during the international workshop on Biodiversity and Tourism. Photo: Rainer Mönke.

Box 1. Conservation Objectives of Tayrona National Park.

- To conserve the diverse mosaic of tropical ecosystems;
- to conserve the habitats of the endemic, special, migratory and endangered species;
- to conserve the coastal marine habitats including the richness and abundance of species;
- to maintain the natural beauties of the littoral landscapes;
- to maintain a representative portion of tropical dry forest and cloud forest in good conditions;
- to keep the sacred sites as part of the indigenous territory of the Sierra Nevada of Santa Marta; and
- to protect 'Pueblito' as a monument and national heritage, along with the pre-Hispanic township sites.

The conflicts in Tayrona National Park are dynamic and, prior to her assassination, the dedication and commitment of Marta Hernández and her colleagues at the Colombian National Parks Service were crucial in working the conflicts from violent and threatening stages towards a stage of arguments and debate. This in turn was a prerequisite for hosting the international experts workshop. Despite great achievements so far, continued violent incidents underline the fragility of the process.

Context

The Tayrona National Park, located on the Caribbean coast of northern Colombia, is one of the 49 protected areas which make up the National Parks System that covers 9% of the national territory. It was declared a protected area by law in 1964, and has an area of 15,000 hectares, including a 3,000-ha marine area. Although the Tayrona National Park does not contain formally designated indigenous reservations, it is part of the ancestral territory of the indigenous groups who live in the Sierra Nevada of Santa Marta.

In 1982, as part of its Man and the Biosphere Programme, UNESCO declared the combined area of Sierra Nevada of Santa Marta and the Tayrona National Park as a Biosphere Reserve, demonstrating the importance of the region in relation to conservation and regional development. The coastal area, although small in extent, is one of the sectors in the Caribbean which contains the greatest biological diversity of the American littoral. The nearby Sierra Nevada of Santa Marta, whose peaks of up to 5,720 m in altitude make it the highest coastal mountain range of the world, influences the landscape and life zones of the region. Within the tropical latitudes, the environments of the Sierra Nevada of Santa Marta range from permanent snow down to the coastal zone.

During the pre-Colombian time, a large indigenous population was present within the area of the Park, as evidenced by various archaeological sites. Many of these have not yet been studied; but it is evident that many of the archaeological sites within the protected area were associated with ceremonial practices. This human occupation lasted until the mid-16th Century. Apart from great stone constructions like 'Pueblito', archaeologists have found semi-permanent or seasonal places for living, cemeteries and ceremonial sites in different places within the boundaries of the Park.

Due to its easy access, its location and the beauty of its landscape with a system of bays, protected creeks and large beaches, the Tayrona National Park is one of the most visited areas of the National Park System, and attracts both national and international visitors. The income that this tourism generates is valuable not only for the maintenance of the area, but also for local people living around the Park who gain a living from tourism activities, and generally for the district and for tourism organisations in Santa Marta.

Due to the proximity of the Park to the city of Santa Marta, the tourist activities organised for city visitors focus heavily on the Park and its attractive landscape and beaches. As a result, the Regional Government and the private sector have a strong interest in promoting ecotourism developments within the area.

Figure 1 demonstrates the virtues and problems related to tourism: the Park still receives a significant number of visitors and income annually even though the numbers of visitors and hence income dropped substantially following civil disturbance problems in 1994/1995, when guerrillas occupied parts of Santa Marta.

The institutional weakness and the vulnerability of the local staff in the light of insecurity and oscillation of violence has limited the integrity and application of the environmental authority. Several staff members have lost their lives, have been threatened or otherwise inhibited in exercising the protection of Tayrona National Park.

Tourism development in the Park happened spontaneously and included the illegal construction of infrastructure without minimum health standards, waste and blackwater treatment. Also, services were offered erratically by operators of boat tours, fishermen, street/beach traders and local inhabitants, often without appropriate quality standards and not meeting the rising demand of tourist satisfaction.

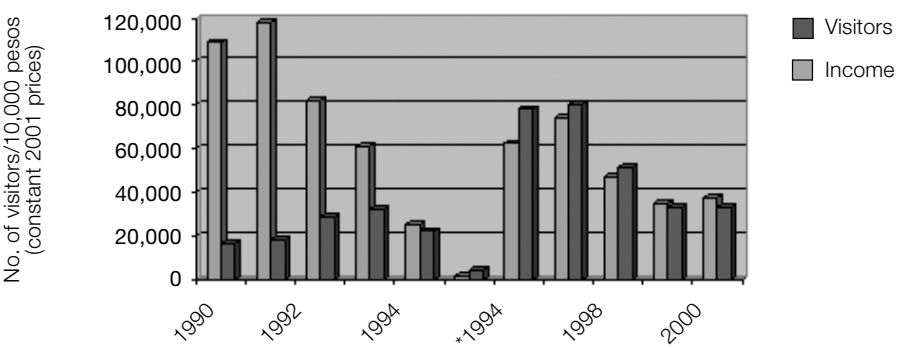
Besides these problems relating to tourism, major conflicts include:

- Land ownership: 90% of the Tayrona National Park area is privately owned. However, it is not clear whether ownership is legal, sometimes there is a superposition of rights. This makes it difficult to identify the right owner with whom to negotiate the acquisition of the land to the nation. Moreover, continuing civil disturbance diverts available government budgets that might otherwise be used for buying land.
- Proposed coal harbour: the regional authorities and the coal industries are looking for a site to built a new harbour to export coal, one of the most important employment generators.
- Indigenous rights and beliefs: previously, visitor planning did not involve the local indigenous organisations which caused resentment against tourism development.

Yet, the National Park Administration implemented an ecotourism strategy to reconcile conflicts regarding land use and occupation of national parks, especially in tourist areas such as the region of Santa Marta/Tayrona National Park, where people have reached a basic agreement on the potential benefits of such a development for visitors, the local economy and the maintenance of the national park through entrance fees and related sources of income.

However, what kind of tourism development at which scale and where are questions hotly debated between the private sector, local/regional government and different government departments including the National Park Administration (NPA). In the case of Tayrona, international

Figure 1. *Tourist visits and income generated.*



*Park closed for public order problems infrastructure maintenance.

Source: Visitor Office, National Parks Service UAESPNN.

Box 2. Elements of the CBD Guidelines on Biodiversity and Tourism Development.

1. Baseline information
2. Vision and goals
3. Objectives
4. Legislation and control measures
5. Impact assessment
6. Impact management and mitigation
7. Decision making
8. Implementation
9. Monitoring
10. Adaptive management
11. Notification process and information requirements
12. Education, capacity-building and awareness-raising

support was sought by the NPA to reconcile different interests while strengthening the position of conservation. This was done through international expert advice and the application of the draft international guidelines of the Convention on Biological Diversity related to sustainable tourism development in a participatory workshop in November 2001.

Application of CBD guidelines on biodiversity and tourism development

The workshop was organised as part of the bilateral cooperation on issues of biological diversity and tourism between the Colombian National Park Authority, UAESPNN, and the German Federal Agency for Nature Conservation. The first objective was to develop conclusions and recommendations concerning the Tayrona National Park's strategy for visitor management through an analysis of the tourism situation in the Park. The second objective was to apply the preliminary version of the CBD Guidelines on Biodiversity and Tourism Development, which had been elaborated in June 2001 by the CBD Secretariat and have now been adopted by COP7 (Decision VII/14), to demonstrate and evaluate their usefulness.

A professional facilitator from the UK guided the discussions and work of 17 participants from:

- Tayrona National Park Administration
- Colombian National Park Authority
- Colombian Ministry of the Environment
- Colombian Ministry for Economic Development
- Regional Government (Magdalena Region)
- National Parks, Biosphere Reserves and Nature Parks in Costa Rica, Germany and Spain.

The methodology was highly participatory, and used a mixture of group discussion, 'brainstorming' techniques, and group evaluation, to gather, collate and assess information. The framework of the draft guidelines provided the overall framework for the workshop. Discussions focused on each element of the guidelines as applied to the context of Tayrona National Park, and evaluated strengths and future challenges to be addressed.

Participants drafted conclusions following discussion and evaluation of each element of the guidelines. Where possible, information was incorporated onto maps using the Park's GIS system, which includes base maps and a range of other information for management of the Park.

For example: the **analysis of objectives** resulted in the following:

To put into practice the vision and goals of the ecotourism development in Tayrona National Park, the Consultative Committee has been created, including – among others – local authorities, land owners and the people offering services in the Park. The following basic objectives have been approved by all members:

- Every action should aim to maintain the integrity and the conservation of the Park.
- It should look for the transference of land ownership to the nation.
- Ecotourism could be used as a tool to solve conflicts.
- The National Park Authority sees ecotourism as a tool and strategy for conservation.

Strengths

- The Park has already accepted the idea of preliminary zoning and carrying capacity studies have defined a maximum limit of tourism development within specific zones.
- There is a basic understanding of ecotourism issues and overall objectives in the Park among the different stakeholders which promotes cooperation.
- It has been agreed by the actors at local and regional level to focus ecotourism activities in certain sectors of the Park.
- The private sector already provides some tourism services in collaboration with the Park. This frees up the technical staff of the Park for conservation and awareness-raising tasks. Such collaboration also increases the support of private enterprises for the work and objectives of the Park.

Challenges to be addressed

- Even though the National Park Authority is willing to put into practice objectives for the sorting out and planning of ecotourism activities, their implementation has been inhibited by the need for complementary and linked actions by other institutions in order to put them into practice effectively. This has slowed progress in implementation of objectives by the National Park Authority.

Participants also identified: recommendations for actions that would address future challenges; stakeholders who could ensure the success of such actions, and actions that would act as a mechanism to resolve or mitigate conflicts of land use and occupation. This is illustrated in Box 3.

Conclusions and recommendations

For the Tayrona National Park, the international expert advice and the application of the CBD Guidelines on Biodiversity and Tourism Development in the participatory international workshop resulted in the adoption of the conclusions and recommendations as a norm for the tourism development in the Park by all the partners which make up the Consultative Committee. This in turn is being incorporated in the elaboration of the Park's management plan, currently being undertaken.

The different interests involved in the conflicts in and around Tayrona National Park acknowledged that tourism development could bring benefits to a variety of different stakeholders. The Colombian National Park Authority used this common ground strategically in developing an eco-tourism strategy in order to address common conflicts of land use and occupation. One has to recognise, however, that this process is fragile in situations of violent conflict.

In the first quarter of 2004, following the loss of its Director, a completely new staff team had to be recruited and trained. Tayrona National Park was also closed for an outbreak of yellow fever and re-opened only in March 2004. After the violent incident, the Park now has the difficult but not impossible task of regaining the confidence of its regular visitors and make more people interested in its natural and cultural values.

Box 3. Recommendations for actions.

Recommendation	Stakeholders
■ To design and run an awareness-raising programme directed at officials of the territorial and industrial entities that are involved in the development of the tourism activities, so as to provide them with the necessary knowledge about the objectives of protection of the park, and an understanding of its natural and cultural values, as well as of the sustainable management of the tourism activities. *Actions realised since workshop:* The Tayrona National Park in 2003 put in place organised guided visits to the Park in which 850 inhabitants and members of the above mentioned institutions of Santa Marta participated. They were made aware of the Park's values and benefits derived from tourism activities. This programme was enlarged to include housewives, taxi drivers, college students, etc.	Regional Government City Council National Park Authority
■ To increase the participation of local communities, people and private enterprises in the supply of ecotourism services, so as to free up the staff of the Park to have more time for conservation and protection duties. *Actions realised since workshop:* The National Park Authority is developing a policy whereby the private sector will take over in concession the services of accommodation, restaurants and retrieving of entrance fees. This in turn will free 30% of the Park's staff to be then dedicated to conservation and protection duties. On the other hand, a new capacity building programme for four local service supplier organisations was put into practice.	National Park Authority Advisory Committee of the Park
■ To achieve better political support at the highest levels of the State for the UAESPNN's conservation mission. *Actions realised since workshop:* The National Government officially declared that the Tayrona National Park could not have any other use than ecotourism. This puts a close to all attempts and plans of using the bays of the Park for a coal harbour.	Several levels of the administration from the central to the local level; legislative, executive and judicial powers; local communities (civil society).
■ To design and implement an information system, and to systematise the information available, so as to facilitate its use for decision making in the Park. *Actions realised since workshop:* An information system was established to identify and locate all constructions – legal as well as illegal – in the Park. This will allow the monitoring of future developments and control mechanisms.	IDEAM, National Park Authority
■ To strengthen the process for indigenous participation in decision-making, and in particular to ensure that their interests are taken into account in the development of ecotourism, and that they gain benefits from ecotourism. *Actions realised since workshop:* The new visitor information for the sacred indigenous site called 'El Pueblito' was designed and elaborated with the participation of the local indigenous organisations. This solved a conflict which had arisen after the first visitor information had been published without the prior consent of the indigenous communities.	Local indigenous organisations, National Park Authority

Dialogues with landowners, local authorities and small enterprises providing services have started again with the objective of agreeing on regulations that define activities and uses allowed in the National Park as well as finalising the first concession in the Colombian National Parks System related to accommodation, food services and recollection of fees.

Both the international workshop with experts from different countries as well as the application of the CBD Guidelines helped to strengthen the position of the National Park Authority in negotiating the process of tourism development inside the Park.

First, the CBD-Guidelines proved to be useful. The participants found that:

- The guidelines are very helpful in providing a framework for coherent, structured and rapid analysis of the management of tourism and biodiversity in the Tayrona National Park;
- The guidelines facilitate planning of solutions, strategies, actions, and selection of priorities;
- The guidelines provide good checklists of key issues, and serve as a reference standard.

As a global product of the CBD process, the Guidelines are being recognised as 'neutral' by different parties involved in the conflict, a reference tool that has been agreed outside the conflict.

The same applies to the international participants of the workshop, which basically contributed their own experience of managing tourism and protected areas. These experiences and views strengthened the policy and management objectives of the Colombian National Park Authority.

As the prophet usually is not recognised in its own lands, and exchanging hands-on experience contributes to raising profile / capacity, it is recommended to international organisations providing support to protected areas – including IUCN – to rely more on the experiences of protected areas managers and staff in their projects and initiatives.

It is also recommended that these international organisations are able to respond quickly to even small activities that the National Park Authority identified as useful in working the conflict and strengthening their role.

Furthermore, international and national organisations should make full use of the CBD-Guidelines on sustainable tourism development. One big merit in the guidelines lies in the fact that they are not bound to protected areas as they apply to all forms of tourism inside and outside protected areas.

Landscape of the Cañaveral Zone in the Tayrona National Park. Photo: Carlos Porras, National Parks Authority.

In times of violent conflict, National Park Authorities especially at national level should seek international support for their actions and plans whenever there appears to be a common ground from where to build trust and confidence. Eco-tourism development might only be one, albeit fragile, way of working the conflict.

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Establishing a transboundary peace park in the demilitarised zone (DMZ) on the Kuwaiti/Iraqi borders

FOZIA ALSDIRAWI AND MUNA FARAJ

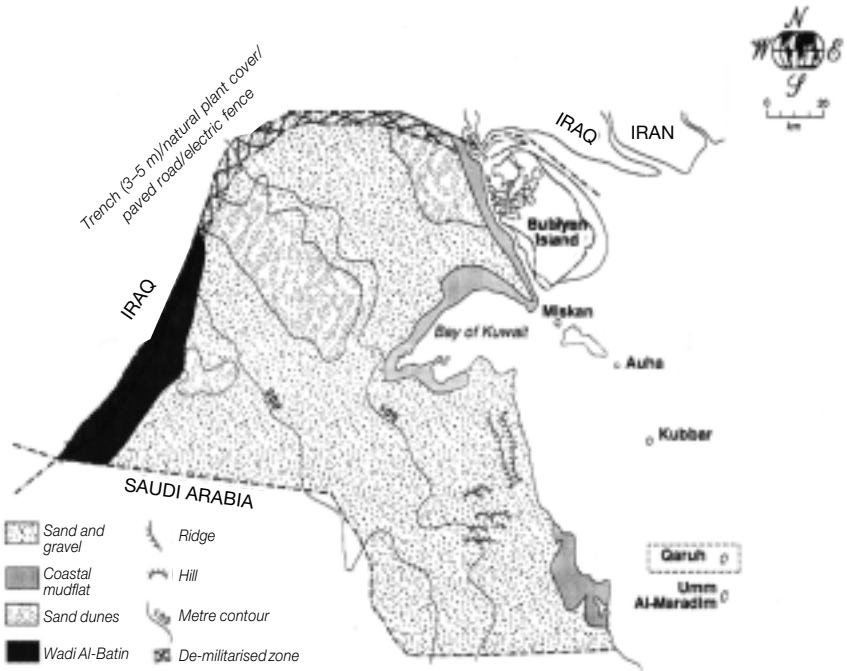
The demilitarised zone (DMZ), located at the northern border of Kuwait with Iraq, is a major achievement of the peace treaty signed by the allied forces and the defeated Iraqi regime after the 1990 Gulf War. The DMZ granted a total protection from human impacts, which led to the natural recovery of the different ecosystems and their biological diversity.

A one-year field assessment was conducted between March 2002 and June 2003 on the Kuwaiti terrestrial part of the zone to document the current situation. The results show the biological and ecological diversity of the DMZ and prove that it is an important route for many internationally threatened bird species, such as the Houbara bustard. The DMZ is home for many endangered and rare mammalian and plant species, such as the Arabian wolf and the perennial herb *Onobrychis ptolemaica*. This study also mapped ecosystems with high potential for future reintroduction programmes of the locally eradicated species that used to roam Wadi Al-Batin, such as the Arabian oryx and the Arabian sand gazelle. Both species are globally threatened.

Giving the current chaotic civil situation in Iraq and the expected comeback of the political and economic relationship between Kuwait and Iraq, one can predict the threats that might face the ecosystems and biological diversity in this part of the world. We urge the declaration of the current DMZ as a transboundary peace park, as a model for the region.

KUWAIT SHARES A 240 KM LONG-BORDER with Iraq on the north and north-west of the country. On this border, the demilitarised zone (DMZ) was declared after the 1990 Gulf War, with a width of five km inside Kuwait and 10 km inside Iraq (Figure 1). The DMZ is protected with a trench of three to five metres in depth and an electrica fence running along the border, with a paved road running between both man-made features. The Kuwaiti border police force, who

Figure 1. *Map of Kuwait showing the location and protection measures of the demilitarised zone (DMZ), north of Kuwait.*



have over 20 stations scattered throughout the zone, patrol the area. The whole area was under the surveillance of UNIKOM, who worked as watchdog for the ceasefire treaty until October 2003.

The main objectives of the field study were the assessment and documentation of the current status of the ecosystem, habitats and biological diversity in the DMZ. The main objective of this work is to advocate the establishment of a peace park on the DMZ with the cooperation of regional and international bodies, under the leadership of The World Conservation Union (IUCN / WCPA).

Biological and ecological surveys and inventories

Biological and ecological surveys were conducted during the late spring of 2002 and early summer of 2003, inside the Kuwaiti part of the DMZ. The vertebrate fauna, flora, habitats and ecosystem diversity were documented. Some information about the seasonal changes in the vegetation cover and bird migration were collected from the Kuwaiti border police, most of whom are local Bedouins.

Ecosystems diversity

Most of the DMZ's land is desert. The landscape is relatively flat – broken occasionally by low sand dunes such as Al-Huwaymiliah and shallow depressions such as Al-Shegaya. The surface elevates gradually from the east to the west reaching about 300 metres above sea level at Al-Shegay and Al-Salmi. The most notable ecosystems and habitats in the zone, from the west to the east, are Wadi Al-Batin, Al-Shegay playas, the sand dunes and the coastal tidal mudflats.

Wadi Al-Batin

This is a dry and shallow valley filled with alluvial sediment, reworked aeolian sands and mixture of rock fragments (Figure 2). The wadi is a relic of the watercourse that once flowed along its length (Alsdirawi 1989). It is one of the most important topographical features in Kuwait. It marks the border between three neighbouring countries, namely: Kuwait, Saudi

Figure 2. *Wadi Al-Batin, one of the remarkable ecosystems inside the demilitarised zone (DMZ), after a good rainy season, with* Diplotaxis acris *as the predominant flora. Photo: Fozia Alsdirawi.*

Arabia and Iraq. The width of the wadi varies from seven to 11 km^2 and its depth from ten to 50 metres below sea level.

The flora of this ecosystem is unique, with *Zilla spinosa* as the most dominant species. The wadi is the exclusive ecosystem for 74 different plant species.

Historically, the wadi was the home for the locally eradicated Arabian oryx *Oryx leucoryx*, the Arabian sand gazelle *Gazella subgutturosa marica*, the Saudi gazelle *Gazella dorcas saudiya*, the cape hare *Lepus capensis*, the wild cat *Felis silvestris iraki*, and the Houbara bustard *Chlamydotis* (*undulata*) *macqueenii* (Alsdirawi 1989, Clayton and Wells 1987, Clayton *et al*. 1983, Dickson 1983).

Al-Shegay Playas

Playas are small depressions found in lowland areas or in the bottom of wadies, where rainwater collects. Playas are locally known as khabrat (Figure 3). The size of these playas can range between one and four km. The zone's playas is large, elongated and occurs in the depressions between residual gravel-capped ridges.

Sand dunes

The sand dunes of the DMZ at Umm Niqa and Al-Huwaymiliah are barchan dunes. Umm Niga dunes are eight scattered relatively large dunes with an average width of 170 m and height of eight metres. Al-Huwaymiliah's dunes are relatively smaller with four successive belts being 25 m wide and three metres high (Khalaf *et al*. 1984).

The barchan dunes (Figure 4) are important habitat to numerous species of reptiles, small mammals, invertebrates and a tremendous assortment of microfauna and plant debris (Alsdirawi 1989, Clayton and Wells 1987).

The anchored dunes are another type of sand dune found in the DMZ, known locally as 'nebkha'. These are stagnant dunes developed by the accumulation of aeolian sands and muddy pellets around halophytic (salt tolerant) shrubs. They occupy a narrow zone along the coastal area of the zone. Nebkha dunes have a convex shape with an average diameter of two to four metres and a height of up to two metres.

Figure 3. *Al-Shegay's playas is one of the remarkable ecosystems inside the demilitarised zone (DMZ), north of Kuwait. Photo: Fozia Alsdirawi.*

Figure 4. *Barchan sand dunes of the demilitarised zone (DMZ), north of Kuwait. Photo: Fozia Alsdirawi.*

Coastal tidal mudflats

The coastal tidal mudflats are formed, like the rest of Kuwait's mudflats, from the settling of fine silt particles coming from Shatt-Al-Arab, where the Tigris and Euphrates rivers of Iraq meet. The mudflats are bordered by salt marshes and coastal sand dunes. The vegetation communities along these habitats are organised into zones or belts that are more or less parallel to the shoreline. The total vegetation cover of these marshes is denser than those of the neighbouring desert plains (Halwagy 1986).

The coastal tidal mudflats are home for three different types of faunal groups (Alsdirawi 1989): (1) transitory migrants that come to the area to feed, such as migratory fishes; (2) breeding species that may use the area for some particular stage of their life cycle, such as shrimp; (3) indigenous species that live their entire life in the intertidal zone, such as three species of mudskipper (*Periophthalnus koelreuteri*, *Boleophthalmus boddarti*, and *Scartelaos viridis*).

The rich, diverse and specialised fauna characterising this habitat attracts migratory birds. During the current work we recorded 71 different species of wintering waders and coastal birds. This habitat is a feeding, resting, and moulting ground of enormous significance for the Arabian wintering birds populations (Alsdirawi 1989, 2002a).

Biological diversity

Alsdirawi (2002b) listed a total of 405 different species of reptiles, birds and mammals for Kuwait. Bolus and Al-Dosari (1994), Al-Rawi (1987) and Daoud (1985) listed 374 plant species as flora of Kuwait. The different ecosystems inside the DMZ are characterised with their own specialised types of fauna and flora. The zone is home for 203 species of vertebrate fauna (Table 1), protecting representative populations of 52% of Kuwait's fauna, some of which are breeding inside the zone (Table 2). Others are regionally and globally threatened (Table 3).

Table 1. *List of the fauna recorded inside the demilitarised zone (DMZ), north of Kuwait.*

	Number of species	
Category	**DMZ**	**Nationwide**
Reptiles	20	47*
Birds	168	314
Coastal and mudflats	71	204
Inland birds	97	110
Mammals	15	32*
Total	203	393

* Includes both terrestrial and marine species

Table 2. *A list of the 32 species of birds that are breeding inside the demilitarised zone (DMZ), North of Kuwait.*

Common Name	**Scientific Name**
White Pelican	*Pelecanus onocrotalus*
Western Reef heron	*Egretta gularis*
Grey Heron	*Ardea cinerea*
Spoonbill	*Platalea leucorodia*
Greater Flamingo	*Phoenicopterus ruber*
Crab Plover	*Dromas ardeola*
Cream-coloured Courser	*Cursorius cursor*
Black-winged Pratincole	*Glareola nordmanni*
Kentish Plover	*Charadrius alexandrinus*
Slender-billed gull	*Larus geneii*
Gull-billed Tern	*Gelochelidon nilotica*
Caspian Tern	*Sterna caspia*
Swift Tern	*Sterna bergii*
Lesser Crested Tern	*Sterna bengalensis*
Sandwich Tern	*Sterna sandvicensis*
Common Tern	*Sterna hirundo*
White-cheeked Tern	*Sterna repressa*
Bridled Tern	*Sterna anaethetus*
Little Tern	*Sterna albifrons*
Pin-tailed Sandgrouse	*Pterocles alchata*
Little Owl	*Athene noctua*
Short-eared Owl	*Asio flammeus*
Bar-tailed Desert Lark	*Ammomanes cincturus*
Desert Lark	*Ammomanes deserti*
Hoopoe Lark	*Alaemon alaudipes*
Bimaculated Lark	*Melanocorypha bimaculata*
Short-toed Lark	*Calandrella brachydactyla*
Lesser Short-toed Lark	*Calandrella rufescens*
Crested Lark	*Galerida cristata*
Temminck's Horned Lark	*Eremophila bilopha*
Swallow	*Hirundo rustica*
House Sparrow	*Passer domesticus*

Table 3. *The 30 regionally and globally threatened and endangered fauna of the demilitarised zone (DMZ), north of Kuwait.*

Reptiles	
Desert Monitor *Varanus griseus*	**Vulnerable**
Birds	
Socotra Cormorant *Phalacrocorax nigrogularis*	Vulnerable
Dalmatian Pelican *Pelecanus crispus*	Lower risk/ conservation dependent
Lesser White-fronted Goose *Anser erythropus*	Vulnerable
Marbled Teal M*armaronetta angustirostris*	Vulnerable
Pallid Harrier *Circus macrourus*	Lower risk/ near threatened
Egyptian Vulture *Neophron percnopterus*	Regionally threatened
Black Vulture *Aegypius monachus*	Lower risk/near threatened
Levant Sparrowhawk *Accipiter brevipes*	Regionally threatened
Greater Spotted Eagle *Aquila clanga*	Vulnerable
Imperial Eagle *Aquila heliaca*	Vulnerable
Lesser Kestrel *Falco naumanni*	Vulnerable
Corncrake *Crex crex*	Vulnerable
Macqueen's Bustard* *Chlamydotis macqueenii*	Lower risk/ near threatened
Black-winged Pratincole *Glareola nordmanni*	Data deficient
Sociable Lapwing *Vanellus gregarius*	Vulnerable
Great Snipe *Gallinago media*	Lower risk/ near threatened
Slender-billed Curlew *Numenius tenuirostris*	Critically endangered
Mammals	
Cape Hare *Lepus capensis*	Endangered
Baluchistan Gerbil *Gerbillus nanus*	Lower risk/ near threatened
Wagner's Gerbil *Gerbillus dasyurus*	Lower risk/ near threatened
Libyan Jird *Meriones libycus*	Lower risk/ near threatened
Euphrates Jerboa *Allactaga euphratica*	Lower risk/ near threatened
Arabian Wolf *Canis lupus arabs*	Endangered
Arabian Red Fox *Vulpes vulpes arabica*	Endangered
Fennec Fox F*ennecus zerda*	Critical locally/ Data deficient globally
Ratel *Mellivora capensis*	Vulnerable
Striped Hyaena *Hyaena hyaena*	Lower risk/ near threatened
Wild Cat *Felis silvestris iraki*	Endangered
Sand Cat *Felis margarita harrisoni*	Endangered

* Houbara Bustard *Chlamydotis undulata*

The DMZ is also the habitat for 167 plant species (Table 4), some of which are rare nationwide (Table 5). It is protecting 45% of Kuwait's flora, 98% of which had traditional and cultural values, including medicinal and cosmetic.

The above-mentioned figures indicate and reflect the rich biological and genetic diversity of the DMZ, as well as the importance of the zone as a genetic pool for the Gulf region.

Value of a transboundary peace park in the DMZ

The creation of a peace park in the DMZ would serve a dual purpose, at the level of ecosystems, habitats and biodiversity conservation and at the political-diplomatic level. A peace park will enable a homogeneous and concentrated approach to management and conservation of the zone and preservation of cultural values. A peace park could be a tool for the political stability in the region, especially if it is endorsed and adopted by the United Nations and the World Conservation

Table 4. *Flora of the demilitarised zone (DMZ), north of Kuwait.*

Category	Number of species
Total	167
Wadi Al-Batin	74
Nationwide	374

Table 5. *The 19 rare species of Kuwait flora, including those reported from the demilitarised zone (DMZ), north of Kuwait.*

Echium rawolfii	*Scorzonera paposa**	*Teucrium polium*	*Ochradenus baccartus*
Silene arenosa	*Cynomorium coccineum**	*Astragalus sieberi**	*Ducrosia anethifolia*
*Aaronsohnia factorovskyi**	*Salvia lanigera**	*Onobrychis ptolemaica **	*Ixiolirion tatarium*
*Pulicaria undulata**	*Salvia spinosa**	*Papaver rhoeas*	*Bellevalia saviczii*
	*Teucrium oliverianum**	*Anagallis arvensis*	*Typa domingensis*

** Rare flora of the DMZ*

Union (IUCN / WCPA). It will endorse the declaration of principles of 'The Parks for Peace Conference, 1997' as a vehicle for international cooperation, biodiversity conservation and economic development

Constraints on the development of a transboundary peace park

The establishment of a peace park in the DMZ is expected to face many constraints, some with diplomatic elements, others related to communications and different administration systems of the two countries, or due to administrative constraints with respect to border crossings and security. But the availability of a number of different international treaties and conventions, which were endorsed by both countries, could significantly contribute to the establishment of a regional peace park and help facilitate this achievement.

Conclusions

The demilitarised zone has been totally protected from human interventions over the past 12 years. Such protection has helped nature to show the amazing resilience that we demonstrated in this study. Currently, the zone is under imminent threat due to the current situation in Iraq. We are concerned that such protection will be threatened due to the changes in the political and administrative situations in Iraq. We are urging the declaration of the zone as a peace park, in accordance with the IUCN declaration, and with the cooperation of both nations: Kuwait and Iraq.

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Résumés

Parcs sous les feux croisés : stratégies pour une conservation efficace dans les zones de conflit armé

JUDY OGLETHORPE, JAMES SHAMBAUGH ET REBECCA KORMOS

Les conflits armés sont susceptibles d'avoir des répercussions considérables sur les zones protégées et la biodiversité par l'intermédiaire de la destruction des habitats, de la surexploitation des ressources naturelles, des pollutions et des perturbations de la gestion qu'ils engendrent. Cet article s'appuie sur de nombreuses études de cas qu'il analyse brièvement, puis passe en revue les différents moyens dont on dispose pour réduire les effets des conflits, à savoir les réponses de la part d'organisations, le renforcement des tentatives de collaboration, et les aspects politiques, commerciaux et gouvernementaux.

Soutien aux zones protégées en période de troubles politiques : le cas des sites du patrimoine mondial de la République Démocratique du Congo

GUY DEBONNET ET KES HILLMAN-SMITH

Les cinq sites du patrimoine mondial de la République Démocratique du Congo (RDC) contiennent des ressources biologiques de grande valeur, notamment des espèces et sous-espèces endémiques d'animaux charismatiques, tels que des gorilles, rhinocéros blancs et okapis. La guerre civile sévissant au RDC depuis huit ans constitue une grave menace pour ces sites. Mais il n'y a pas que des mauvaises nouvelles. Un effort international majeur de coordination par le Centre du patrimoine mondial auquel ont participé de nombreuses organisations non gouvernementales a permis aux zones protégées de continuer à fonctionner malgré le chaos régnant autour d'elles. De cet effort ont pu être tirées d'importantes leçons concernant la gestion des zones protégées en période de conflits violents : elles comprennent la nécessité d'assurer la flexibilité des plans d'interventions sur le terrain et de l'apport du soutien qu'on s'efforce de maintenir, la mise en place d'alliances avec les populations locales, la nécessité de poursuivre le soutien apporté aux activités de conservation, et la coopération avec les forces armées de tous bords.

Situation du Parc national de Comoé, Côte d'Ivoire et les conséquences de la guerre

FRAUKE FISCHER

Le Parc national de Comoé (PNC) est le parc de savane le plus étendu de l'Afrique occidentale, hébergeant une très grande diversité d'animaux et de plantes répartis dans une gamme très variée d'habitats. Certains des éléments de sa faune et de sa flore sont rares ou sont menacés d'extinction dans toute l'Afrique occidentale ; pour d'autres, le PNC constitue un ultime refuge à l'intérieur du pays. Les activités de gestion ont été insuffisantes depuis une vingtaine d'années, en grande partie en raison de la pénurie de moyens financiers, ce qui a entraîné une forte recrudescence du braconnage à l'intérieur du parc. Cette dernière a conduit à une baisse des populations de mammifères de grande taille, qui a provoqué à son tour une baisse des revenus financiers provenant de l'utilisation non consommatrice de la faune et de la flore, telle que le tourisme. L'éclatement d'une révolte à la suite d'un coup d'état manqué en septembre 2002 a conduit à la création d'un front passant encore aujourd'hui par les parties du parc situées au sud. L'effondrement complet de toute structure de gestion, la retraite des scientifiques étrangers et l'augmentation signalée du braconnage ont contribué à l'aggravation de la situation. Si on admet l'existence d'un éventuel effet de refuge en zone de guerre, celui-ci n'a duré que pendant une période de temps très limitée. Les limites du parc et la diversité de ses habitats ne sont pas encore menacées et la plupart des populations de mammifères sont encore viables. Pour sauver le parc, il est nécessaire d'obtenir la coopération immédiate et efficace d'acteurs au niveau international. A long terme, il serait très souhaitable de mettre en place une zone de coopération transfrontière reliant le Parc national de Comoé et celui de Mole au Ghana ainsi que des sites au Burkina-Faso.

Redressement à la suite de conflits: le cas du Dinder et d'autres parcs nationaux au Soudan

WOUTER VAN HOVEN ET MUTASIM BASHIR NIMIR

La gestion des zones protégées au Soudan a été négligée en raison de la prolongation de la guerre civile. Le pays possède six parcs nationaux, treize réserves d'animaux sauvages et trois sanctuaires naturels. Bien que les parcs nationaux de

Dinder et de Radom soient également classés réserves de biosphère, les principes d'établissement et de gestion correspondant à cette désignation n'ont pas été appliqués et il n'existe pas de plans de gestion pour les zones protégées. Les populations de la plupart des espèces de faune et de flore du Parc national de Dinder ont vu leurs effectifs se réduire d'environ 80% au cours des 25 dernières années. Le parc a une superficie de 10 000 km^2, enregistre des précipitations annuelles égales à 600 mm et se trouve être la région d'Afrique la plus au nord où l'on trouve des antilopes rouannes, des buffles de Cafrerie, des éléphants, des phacochères, des coudous et des lions. Ce parc est le seul parc du Soudan dans lequel certains efforts de gestion et de protection sont poursuivis et il a été visité par 300 touristes en 2003.

Menaces pesant sur les zones protégées au Népal

PRALAD YONZON

Le Népal est un pays à la diversité remarquable dont les habitats se déclinent de forêts de plaine jusqu'à des pics recouverts de glace. Malgré le fait qu'une grande partie de la population du pays vit dans une pauvreté absolue, le gouvernement a réalisé des investissements considérables dans la conservation des zones protégées, qui occupent 19% de la superficie du pays. Cependant, depuis plusieurs années, ces zones protégées se trouvent mises en péril par un mouvement d'insurrection, qui a conduit à une augmentation du braconnage des rhinocéros, à la destruction de l'infrastructure des zones protégées et à l'abattage illégal d'arbres en vue d'une exportation du bois vers l'Inde. Une action d'ensemble au niveau international est nécessaire pour assurer la continuité des valeurs pour lesquelles les zones protégées ont été établies.

Parc national de Tayrona, Colombie: soutien international pour une résolution des conflits par le tourisme

JENS BRÜGGEMANN (ALLEMAGNE) ET EDGAR EMILIO RODRIGUEZ (COLOMBIE)

Le Parc national de Tayrona est situé sur la Côte des Caraïbes en Colombie. La politique d'écotourisme de l'Administration du parc national UAESPNN s'est attaquée avec succès à la résolution des différents conflits concernant l'utilisation et l'occupation des terres. Cet article montre comment le soutien international à la mise en application de la version préliminaire des Lignes directrices du CBD sur la biodiversité et le développement du tourisme a favorisé ce processus.

Etablissement d'un parc transfrontière pour la paix en zone démilitarisée à la frontière entre l'Iraq et le Koweït

FOZIA ALSDIRAWI ET MUNA FARAJ

La zone démilitarisée (DMZ) située à la frontière nord du Koweït avec l'Iraq est un acquis majeur du traité de paix signé par les forces alliées victorieuses et le régime iraquien vaincu à la suite de la guerre du Golfe de 1990. La DMZ a permis de garantir une protection totale contre les impacts humains, ce qui a permis la protection et le rétablissement naturel des différents écosystèmes et de leur diversité biologique.

Une évaluation de terrain d'une durée d'un an environ a été entreprise entre mars 2002 et juin 2003 dans l'aire terrestre koweitienne de cette zone pour recueillir des données sur la situation actuelle. Les résultats de ce travail fournissent des informations sur la diversité biologique et écologique de la DMZ et prouvent qu'elle se situe sur le parcours de nombreuses espèces d'oiseaux en péril, telles que l'outarde houbara. La DMZ abrite de nombreuses espèces de mammifères et de plantes menacées et rares, telles que le loup d'Arabie et l'herbe pérenne *Onobrychis ptolemaica*. Cette étude a également cartographié les écosystèmes à fort potentiel pour de futurs programmes de réintroduction d'espèces locales éradiquées qui parcouraient le Wadi Al-Batin, telles que l'oryx d'Arabie ou la gazelle d'Arabie. Ces deux espèces sont menacées au niveau planétaire.

Etant donné la situation chaotique actuelle de la société civile iraquienne et la reprise attendue des relations politiques et économiques entre le Koweït et l'Iraq, il est possible de prévoir les menaces susceptibles de peser sur les écosystèmes et la diversité biologique dans cette partie du monde. Nous nous prononçons vivement en faveur de la déclaration de la DMZ comme parc transfrontière pour la paix, se constituant ainsi en modèle pour la région toute entière.

Resumenes

Parques bajo fuego cruzado: estrategias para la conservación efectiva en áreas de conflicto armado

JUDY OGLETHORPE, JAMES SHAMBAUGH Y REBECCA KORMOS

Los conflictos armados, a través de la destrucción del habitat, el excesivo uso de los recursos naturales, la polución y el adverso efecto sobre la administración del área, pueden tener un impacto enorme en las áreas protegidas y en la biodiversidad. Este artículo se basa en numerosos casos estudiados, los analiza brevemente y luego bosqueja posibles opciones para reducir los impactos incluyendo las respuestas organizacionales, realzando la colaboración y los aspectos politicos, comerciales y de gobierno.

Manteniendo las áreas protegidas en tiempo de desorden político: el caso de los Sitios de Patrimonio Mundial en la República Democrática del Congo

GUY DEBONNET Y KES HILLMAN-SMITH

Los cinco sitios de Patrimonio Mundial en la República Democrática del Congo (RDC) contienen valiosos recursos naturales, incluyendo especies endémicas y de animales carismáticos tales como gorilas, rinocerontes blancos y okapis. En los últimos ocho años estas áreas han sido seriamente amenazadas por la guerra civil en la RDC. Sin embargo, las noticias no son todas malas. Un gran esfuerzo internacional, coordinado a través del Centro de Patrimonio Mundial y que incluye numerosas organizaciones no gubernamentales, ha permitido que las áreas protegidas continúen funcionando a pesar del desorden que las rodea. Este esfuerzo ha enseñado importantes lecciones acerca del manejo de las áreas protegidas en tiempos de conflicto violento y ha incluído un diseño flexible de las intervenciones en el terreno y el apoyo continuo, construyendo alianzas con la población local, manteniendo el apoyo de las actividades de conservación y cooperando con las fuerzas armadas de todas las facciones.

La posición del Parque Nacional Comoé en la Costa de Marfil y los efectos de la guerra

FRAUKE FISCHER

El Parque Nacional Comoé (PNC) es el parque de sabana más grande del África occidental, alojando una enorme diversidad de animales y plantas en una inmensa variedad de habitats. Algunos de los elementos de su fauna y flora son raros o están amenazados, otros han encontrado su último refugio en el PNC. Debido mayormente a una falta seria de recursos financieros, las actividades de gestion de los últimos años han sido insuficientes, resultando en un aumento considerable de la caza furtiva dentro del parque. Ésto, con el tiempo, ha causado una disminución de las grandes poblaciones de mamíferos, con la consecuente reducción de los ingresos financieros provenientes del uso no consumidor de animales salvajes, tales como el turismo. El estallido de una rebelión que siguió a un fallido atentado de golpe de estado en 2002, dio lugar al desarrollo de una línea fronteriza que todavía corre a través de la parte sur del parque. La situación empeoró con el colapso completo de las estructuras administrativas, la retirada de los científicos internacionales y según informes, el aumento de la caza furtiva. Si se asume que en algún momento existió un lugar de refugio en la zona de guerra, éste sobrevivió por un muy limitado período de tiempo. Las fronteras del parque y la diversidad de sus habitats no están todavía en peligro y la mayoría de las poblaciones de mamíferos permanecen viables. Es necesaria una cooperación internacional eficiente e inmediata para salvar el parque. A largo plazo sería deseable el establecimiento potencial de una zona transfronteriza de conservación que conecte el PN Camoé con el PN Mole en Ghana y con sitios en Burkina Faso.

Recuperándose del conflicto: el caso de Dinder y otros parques nacionales de Sudán

WOUTER VAN HOVEN ET MUTASIM BASHIR NIMIR

El manejo de áreas protegidas en Sudán ha sido descuidado debido a la prolongada guerra civil. El país tiene seis parques nacionales, trece cotos de caza y tres santuarios de la naturaleza. A pesar de que los parques nacionales de Dinder y Radom han sido también declarados Reservas de la Biosfera, los principios de diseño y administración para este tipo de denominación no han sido implementados y no existen planes para el manejo de las áreas protegidas. La mayoría de las

especies salvajes en el Parque Nacional de Dinder han sufrido una declinación del 80% en los últimos 25 años. El parque tiene una superficie de 10,000 km^2, tiene una precipitación pluvial de 600 mm y es la región más norteña de África donde se pueden encontrar antílopes ruanos, búfalos del cabo, elefantes, cerdos verrugosos, cudúes y leones. Este es el único parque en Sudán donde tiene lugar una cierta protección y donde se recibió la visita de 300 turistas en 2003.

Amenazas a las áreas protegidas de Nepal

PRALAD YONZON

Nepal es un país notablemente variado con habitats que van desde los bosques de tierra baja hasta los picos cubiertos de hielo. Aunque el país tiene un gran número de habitantes que vive en una pobreza absoluta, el gobierno ha invertido considerablemente en las áreas protegidas, cubriendo alrededor del 19% del área de tierra del país. Sin embargo, en los últimos años, un movimiento insurgente ha amenazado muchas de estas áreas protegidas y ha resultado en un aumento de la caza furtiva de rinocerontes, la destrucción de la infraestructura de las áreas protegidas y el robo de madera para exportarla a la India. Se requiere un esfuerzo internacional concertado si es que las áreas protegidas de Nepal han de mantener los valores por los cuales fueron establecidas.

El Parque Nacional Tayrona, Colombia: apoyo internacional para resolver conflictos a través del turismo

JENS BRÜGGEMANN (ALEMANIA) Y EDGAR EMILIO RODRÍGUEZ (COLOMBIA)

El Parque Nacional de Tayrona está situado en la costa caribeña de Colombia. Los diferentes conflictos sobre el uso y ocupación de la tierra han sido reconocidos por la política de ecoturismo de la administración nacional de los Parques Nacionales. Este artículo muestra como el apoyo internacional en la aplicación de la versión preliminar de las pautas de la CDB en el Desarrollo del Turismo, ayudó en este proceso.

Estableciendo un parque de paz transfronterizo en la zona desmilitarizada de los bordes entre Kuweit e Iraq

FOZIA ALSDIRAWI Y MUNA FARAJ

La zona desmilitarizada (ZDM) situada en el borde norte de Kuweit con Iraq, es el mayor logro del tratado de paz firmado entre las fuerzas aliadas victoriosas y el derrotado regimen iraquí, después de la guerra del Golfo en 1990. La ZDM otorgó la protección total de impactos humanos que consecuentemente llevó a la protección y recuperación natural de los distintos ecosistemas y su diversidad biológica.

Para documentar la situación en la parte terrestre de Kuweit, se condujo una evaluación del campo que duró un año, desde marzo de 2002 hasta junio de 2003. Los resultados de este trabajo documentan la diversidad ecológica y biológica de la ZDM y prueba que es un corredor importante para muchas especies de aves amenazadas internacionalmente, como la avutarda de Houbara. La ZDM es el hogar para muchos mamíferos y especies raras de plantas en peligro, tales como el lobo de Arabia y la hierba perenne *Onobrychis ptolemaica*. Este estudio también ubicó ecosistemas con un gran potencial para futuros programas de reintroducción de las especies erradicadas localmente y que antes vagaban en Wadi Al-Batin, como el órix árabe y la gacela árabe de arena. Ambas especies están amenazadas globalmente.

Dada la dificil situación civil en Iraq y el esperado retorno de las relaciones políticas y económicas entre Kuweit e Iraq, uno puede predecir las amenazas que podrían enfrentar los ecosistemas y la diversidad biológica en esta parte del mundo. Recomendamos que se declare la presente ZDM como parque transfronterizo de paz que sirva de modelo para la región.

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