

RESEARCH

Monitoring law enforcement and illegal activities in the northern sector of the Parc National des Virunga, Democratic Republic of Congo

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Abstract

The Parc National des Virunga in the Democratic Republic of Congo, is emerging from a period of civil strife during which it has been difficult for the park management authority to undertake any meaningful conservation activities. Of particular importance in the struggle for survival of the elephant is the threat that poachers pose. During this difficult time, the Congo National Parks Institute had to adopt a low-key survival strategy, as it was not staffed or equipped to carry out its mandate. This paper focuses on a law-enforcement project carried out in the northern sector of the park. It presents systematically conducted law enforcement as an effective way of ensuring that protected area regulations are observed and that wildlife offenders are deterred. It points out current ecological threats that face the park. During the project period, the deterrence effect was equally important for both conventional and investigative operations. The paper emphasizes that increased effectiveness in anti-poaching can be achieved only by appropriate law enforcement as a deterrent by providing information that site managers can use to determine how to allocate resources optimally to improve protection and management of elephants and other wildlife. Optimizing law enforcement can lead to optimizing the level of deterrence and reducing illegal offtake to predetermined acceptable levels.

Résumé

Le Parc National des Virunga se reconstitue peu à peu de la période difficile pendant laquelle il était peu aisé pour le gestionnaire du parc d'entreprendre des activités de conservation. D'une façon particulière, la lutte engagée pour la survie de l'éléphant suite à la menace résultant du braconnage demeure vivace. En cette période, l'Institut Congolais pour la Conservation de la Nature (ICCN) a adopté un profil bas en terme de stratégie de protection du parc au regard du nombre limité de gardes et l'équipement insuffisant pour assurer avec succès la mission lui dévolue. Dans la présente étude, nous présentons un aperçu global sur l'application effective de la loi en tant qu'un moyen efficace pour le respect de la réglementation de la loi en vigueur dans l'aire protégée en même temps qu'elle fournit aux gestionnaires d'une aire protégée l'information utile pouvant lui permettre de prévenir les infractions tout en réduisant sensiblement le prélèvement illégal des éléphants. L'optimisation en terme de l'application effective de la loi réglementant la gestion de la faune sauvage peut conduire à l'optimisation du niveau de détection et du reste, à la réduction de prélèvement illégal à un niveau acceptable.

Introduction

Parc National des Virunga (PNVi) is emerging from a period during which it was difficult for park management to undertake any meaningful conservation activities. The period represents a phase of lost opportunities, unfulfilled objectives, reduction in wild animal populations, destruction of forests, human encroachment on protected areas, creating yet more ominous threats in the elephant's struggle for survival. Some of these threats are the direct result of chaotic park management. Of particular importance is the threat that poachers pose (Talukdar 2002). Recent data show that it is not deforestation but defaunation that poses the greatest immediate threat to animal conservation (Bennett Hennessy 1995). In addition, chronic civil strife spawned guns in wrong hands, a situation that has taken a heavy toll on wildlife. There have been movements of people and economic hardship, all of which have led to increased pressure on protected areas. During this difficult time, the Congo National Parks Institute (ICCN) adopted a low-key survival strategy, as it was unable to carry out its mandate while renegade people took the law into their own hands. The particular sociopolitical context of the region presents complex problems for managing protected areas.

Against this background parks could not be expected to run themselves. Comprehensive monitoring, which indicates the rate of encounter in the field with various types of illegal wildlife use, can help steer field operations in a manner that will optimize their level of efficiency. Optimizing law enforcement leads to optimizing the level of deterrence and reducing illegal offtake to predetermined acceptable levels. It helps determine how best to invest limited funds to deter illegal activities. For both conventional and investigative operations the deterrence effect is important.

This paper focuses on a law-enforcement project carried out in the northern sector of PNVi, a project mainly funded by the Small Grants Fund of the IUCN/SSC African Elephant Specialist Group for the period from 1 July 2002 to 31 July 2003. The project made a preliminary study of background factors affecting elephant poaching and other illegal activities by using a state-of-the-art geographic information system (GIS).

Our aim is to present an overview that assesses the current extent of law-enforcement efforts as an effective way to ensure that protected area regulations are being observed, to deter wildlife offenders

and to reduce steeply the illegal offtake of elephants. The study identified the types of illegal activities while emphasizing current ecological threats facing the park along with possible baseline conservation strategies, and paves the way for further research.

Study area and habitat description

PNVi's varied habitats cover one of the most important bio-geographic areas of the first national park in Africa, created in 1925. The rich biodiversity of this natural ecosystem makes it a backbone and the show-piece of the biological diversity in the protected areas network of eastern Democratic Republic of Congo (DRC). It remains a natural crossroads where dense human population and fascinating wildlife have lived in historic harmony for years as a result of a combination of several factors, including widely varying altitudes, the overlap of several bio-geographic areas, fertile soils, a lake and heavy rainfall.

The 3500-km² northern sector of the PNVi ecosystem falls within the sudano-guinean savannah and montane forest biome between latitudes 0°95' N and 0°26' S and longitudes 28°9' E and 29°5' E. The alluvial Semliki Plain essentially dominates the northern sector of PNVi; it lies where the Semliki River, coming from Lake Edward, flows into Lake Albert (fig. 1). It is part of the Albertine rift valley, a bio-geographic region important for its biological diversity as it contains a high proportion of endemic plants and animals. The region is also ecologically important as a portion of the watershed for two main African river systems—the Congo and Nile basins—and culminates at Marguerite Peak (5119 m) in the Ruwenzori Mountains.

Methods and analytical framework

Data collection and navigation

Law-enforcement methods the project used were of a hierarchical design that fell into two classes: conventional in the form of foot patrols within the study area, and non-conventional in the form of investigation operations following up information supplied through a recently developed system of informants outside the study area (Jachmann and Billiouw 1997). Patrolling involved routine inspection inside the park, checking the boundaries, sometimes patrolling outside the park, and visiting local villages neighbouring the park. Although guards were put on patrol with little training or

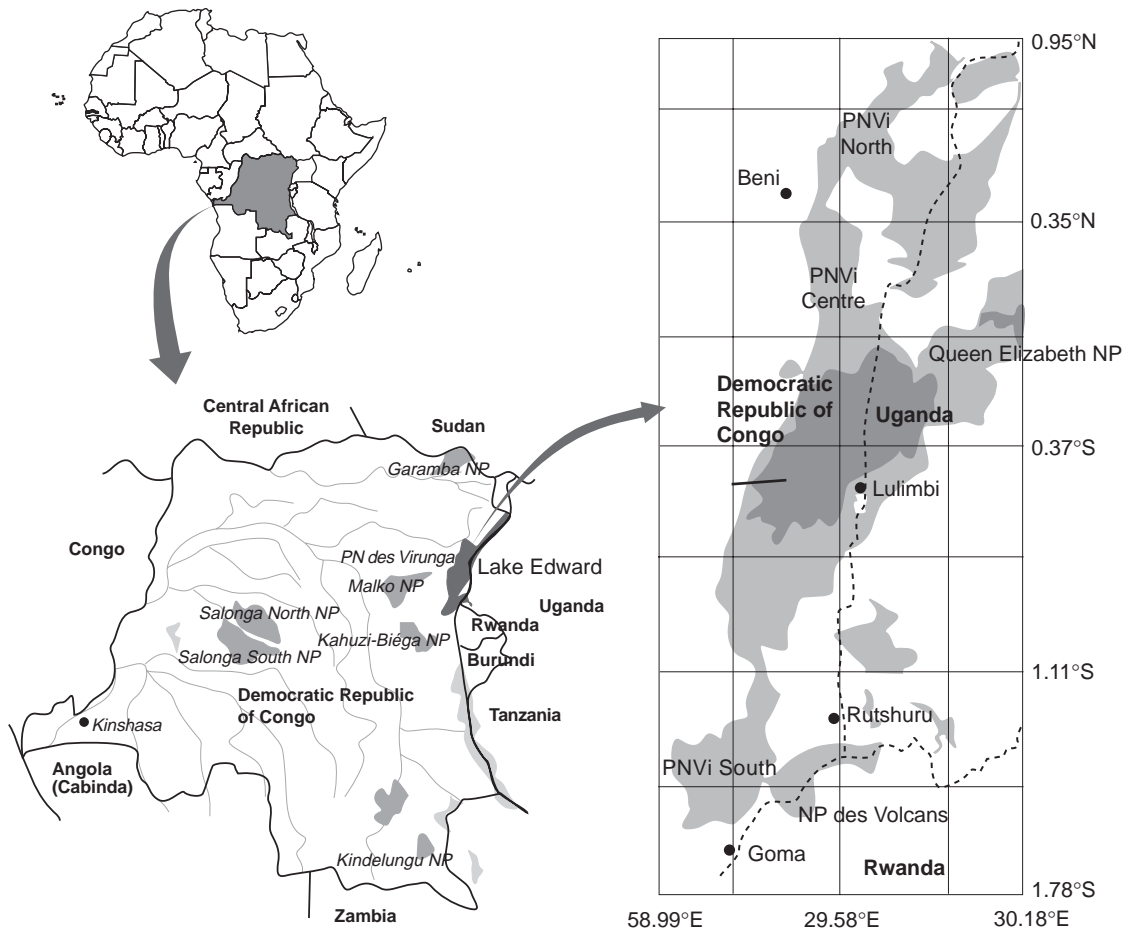


Figure 1. Parc National des Virunga (PNVi, right) and its location in the Democratic Republic of Congo (left) (NP = national park).

scientific background, even those with the lowest educational standards were able to achieve a high level of reliability in recording patrol information during regular monthly patrols. Law enforcement data were analysed to allow better deployment of patrols, the collation of intelligence, and an assessment of the effectiveness of patrols in curbing poaching.

A survey technique for guards designated and trained to record observations made while on patrol was used regularly. They recorded all information on actual encounters with poachers such as poachers observed or arrested and indications of their presence such as poachers' camps found, poached carcasses, active snares and gunshots heard. Data entry sheets included field maps, and the dense network of rivers and streams in the park together with the pronounced

local knowledge of the guards ensured relatively accurate positioning of observations made. Spatial precision of the recordings was enhanced with the use of the global positioning system (GPS). They also recorded 'effective patrol days', that is, days spent actively pursuing illegal activity while on conventional foot patrol (Bell 1985a,b). They used a standardized patrol form for each conventional patrol, which included general information on the patrol, information on animal sightings and carcasses, encounters with illegal activity or indicators of it, and information relating to the patrol route followed.

On return from patrol, the patrol leader and the patrol recorder were debriefed to ensure comprehensiveness and accuracy. The patrol route and any incidents of illegal activities were indicated on a grid map of the

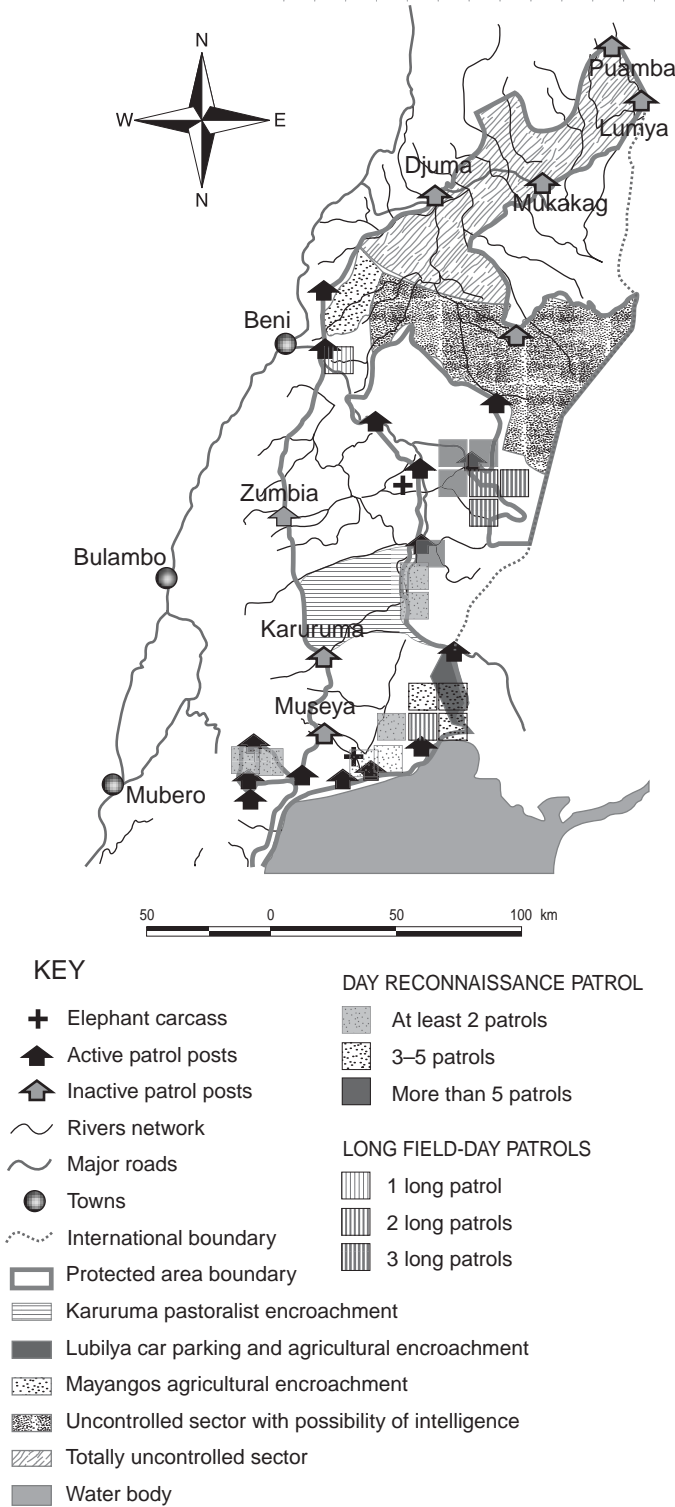


Figure 2. Sectors showing law enforcement and those covered by patrols in northern Parc National des Virunga.

5 x 5 km area (fig. 2). This information became part of monthly feedback reports (Jachmann 1998).

It was important to be realistic and practical about areas to be covered, distances to be walked, and how and by whom the patrol would be conducted and supervised. If for any reason it was not possible to cover an area fully or even partially, the fact was reported unambiguously. From the outset, it was made clear to the entire armed patrolling squad that if such facts were not reported, the survey data would be rendered invalid. For selected sample units, detectability could then be estimated using either the multiple-observer approach or the approach of a single observer making multiple visits. Under the multiple-observer approach, two different field teams were sent to the same sample unit (sector) on different days. The time separating the two visits was short, but long enough that the human sign left by the first field team did not lead the second team to detect it and interpret it as an animal sign. Under the single-observer approach, a single field team would revisit for a second time sample units (sectors) in which no sign was detected the first time. Under both multiple- and single-observer approaches, the information resulting from patrol efforts was a list of species that were detected or not detected on each field trip. These presence-absence lists collected on the repeat visits then formed the basis for estimating detectability, and hence the total proportion of sample units (sectors) that was more or less patrolled. At least one member of the team was given the task of writing down the information and later transferring it to the maps.

The first step towards monitoring law enforcement and illegal activities was to measure patrolling effort. First, staff time was divided into categories according to likelihood of contact with poachers, such as base time, off time, placement time and effective patrol time. ‘Placement time’ was defined as time spent moving between base and the location of the investigation and ‘effective investigation time’ as time spent



Community schemes have proved effective elsewhere in deterring local poaching. However, poaching by organized gangs may not be as successfully tackled through community schemes when heavily armed gangs come from outside the park. Here at the Epulu headquarters checkpoint, manpower is directed into law-enforcement patrols, ready for immediate deployment.

actively investigating information about illegal activity. Only the last category is used in calculating patrol effort, while the ratio of effective time to the other categories is a useful index of the efficiency and motivation of field staff. Effective time is time spent on foot in the bush, away from roads and certain footpaths. The most useful measure of patrol effort was the number of *effective patrol days* and the distance patrolled (coverage). For patrol reports, the standard recording forms developed by the CITES/MIKE programme were used (Hunter 2002).

The system was intended first to quantify patrolling effort by various measures; second to quantify illegal activity encountered by patrol according to a set of standardized categories; and third to derive indices of the amount of illegal activity recorded per unit of patrolling effort. This gave a 'catch per effort' index of the quantity of illegal activity.

Use of informers

Investigation operations were mainly carried out in the villages and cities surrounding the park, following back to its source information supplied by inform-

ers or guards. Much of the information was provided using pygmies living at a village near the patrol post. These dedicated people managed to gain access to parts of the uncontrolled area due to their knowledge of it. As more than 60% of the park is open canopy, detecting carcasses was not a problem, and observing the presence of birds of prey helped.

GIS modelling

State-of-the art GIS served as a powerful tool for creating maps, making measurements, examining spatial relationships, and undertaking predictive modelling. It can greatly assist wildlife managers in decision-making. Spatially linked law-enforcement data can easily be entered in the GIS and plotted on base maps. Spatial-temporal data on law-enforcement effort

(patrol routes, patrol frequency, and so on) and law-enforcement results (indicators of illegal killing of wildlife, poacher arrests, and so on) are among the most important correlates of elephant distribution. Our GIS-produced map provided a strong visual and analytical aid for this assessment and helped identify priority areas and resource and management needs. GIS was useful in mapping locations of patrol routes and illegal activity indices and in calculating patrol effort in different zones. This information was then related to sighting and poacher-detection data to evaluate the performance or success of law enforcement (Leader-Williams et al. 1990; Leader-Williams 1996).

Results and discussion

Relating illegal activity to patrol effort

Law enforcement is a fundamental management activity. It involves more than just controlling poaching even though this might be the core activity of the corps of guards and rangers involved. The commonly used term 'anti-poaching' is therefore inadequate and is replaced here by 'law enforcement'.

During the study period, 2 elephants out of the 21 counted following a recent aerial survey (Hillman Smith et al. 2003a,b) were known to have been killed. Obviously not all the project area could be covered by foot patrols, and consequently some elephants killed illegally may have been missed, particularly in the far northern Watalinga area, including Djuma, Mukakati, Lamy and Puemba, where three former patrol posts remain inaccessible for security reasons (fig. 1). Information available from these areas comes from informant sources building upon limited information of the operations carried out within the park. Occurrence books and reports from park headquarters during the study period show only two documented cases of human–elephant conflict in the agricultural settlements. Although conflict between people and elephants seems little documented, it is important to note that some crop depredation might have gone unreported, often because it occurs in remote areas with poor patrol coverage (fig. 2). Better quantitative data on crop damage are required as little is currently known about the extent of damage in specific areas.

The number of guards the park employs has not increased since June 2001. Out of the 17 patrol posts park management currently runs, only the headquarters in Mutsora and the Ishango subheadquarters were equipped with 25 recently acquired weapons, thanks to the park warden's invaluable diplomatic initiative. The guards in the remaining patrol posts were unarmed and thus had necessarily adopted a passive 'eyes and ears' role. Most poachers were aware of this reality and not surprisingly showed scant respect for rangers (Mubalama 2000). The reduced law-enforcement operations that ICCN maintained were still having a slight positive effect: in June 2003, 10 people were arrested, 28 snares destroyed, and in Mayangos, Makisabo and Nyaleke areas 9 saws for pit sawing, 2 axes, 4 spades and 12 machetes were seized (fig. 2); in a raid carried out by guards less than 24 hours later, armed guards seized another chain saw. The average guard density of one guard per 36 km² in the northern sector was much less than the density of one guard per 10 km² in the central and eastern PNVi sectors (Mubalama 2000).

Poaching and park security

This study found that poaching elephants for their ivory has increased; hunters prefer going after larger species

because they provide higher returns for the cost of hunting (Leader-Williams et al. 1990). From 1997 until 2001, more than 60 elephants were poached in various parts of the park exclusively for their ivory (Mushenzi 2002). The civil conflict in DRC, which has continued since 1997, precipitated an upsurge, because guards were disarmed and anti-poaching was curtailed for several months following the spread of loose guns. Record keeping was poor throughout the park before 2002. It is thus possible that, because records on elephants were poorly maintained and undercover informant sources were lacking, poachers might have killed many more elephants in the park than the park staff realized, especially in uncontrolled areas of relatively broad-leaved woodland (Mubalama 2000) with possibly poor coverage through inadequate patrol effort (fig. 2).

Poaching remains the major threat facing elephant conservation. Whenever animals are poached staff morale drops, and whenever staff morale is low, poaching levels rise. However, whenever morale of the guards is high, poaching is slightly reduced, as 2002 data show. This situation was consistent with Talukdar's striking findings following his recent study on rhino poaching in Assam, where poaching fluctuated according to the local situation such as the degree of social instability, political and administrative support, and quality of intelligence (Talukdar 2002). In addition, security in the park remained precarious, especially where small, isolated anti-poaching teams were constantly at risk of being attacked by poachers, notably in the more remote northern sector of the park where the severe lack of workforce was basically linked to the insufficient budget allocated to these areas. Moreover, current infrastructure was not adequate to support distant patrols efficiently. Despite their tough anti-poaching stance and motivation, the lightly armed and outnumbered park rangers were powerless to oppose the well-armed and determined poachers, who were largely elements of the military.

Lucrative prices offered by ivory traders have increased the financial gains of the illegal trade, resulting in a large number of mafia-like operations, which the guards with their limited organizational set-up find difficult to counter. In addition, the judiciary and the police have shown little sensitivity towards quick apprehension and timely prosecution of elephant-poaching offences (Boshe 1986; Talukdar 2002).

Various criteria affect the price of ivory in the market: weight of the tusk (those over 8–10 kg have a special price, a kilogram of ivory fetching USD 10

on the local market); colour (white is preferable); depth of the fissure (varies according to age and sex of the animal); whether the tusks come from the same animal or not (a pair sells for a higher price than two single tusks).

Three categories of traffickers were identified: 1) military and bigwig political store owners, who got ivory by providing weapons and ammunitions to well-identified poachers and took their loot to Kampala; 2) wealthy Congolese store owners, who organized their trade in collusion with ivory traffickers; and 3) small-scale traffickers who bought from hunters and went to Beni or Butembo areas (fig. 1) to sell or who found that sometimes it was more profitable for them to exchange tusks for ammunition directly. For a village man, owning a gun was thus a sure means of obtaining food and good housing. Earnings from ivory poaching enabled some traditional chiefs and successful hunters to own houses built of permanent materials. Meat was plentiful for those living in the neighbourhood of the park on the border with Uganda where they undertook cross-border trade; some was consumed locally but most was sold.

Illegal human activity and park encroachment

Observations showed that large herds of livestock were concentrated in the Karuruma area with about 4500 cattle (Mushenzi, pers. observation) and an undetermined number of sheep and goats brought in by Ugandan herdsmen of the Hema tribe. The most telling indication was that 26 km² of the Karuruma area and 9 km² of Mayangos area had been encroached on (Mubalama, pers. observation) while 7 km² of encroached land with a car park measuring 68 m² was established in the park at Lubiriya (fig. 2), countering all common sense (Les Coulisses 2000). These figures signify a high level of illegal human activity, including boundary demarcation issues, as a direct result of park encroachment. This interaction involved competition for limited resources such as water and grazing areas. With the presence of so many illegal firearms in the hands of these foreign herdsmen, who were often seen carrying them while herding their livestock, incidents of elephant mortality will continue to increase. It is thought that the Hema pastora-

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A poacher after killing an elephant, caught red-handed by a long field-day patrol team in Lulimbi sector.

lists use *Euphorbia candelabrum*, so characteristic of much of the park, to make their cattle stockades because it is abundantly available.

A major challenge emerged in attempting to develop sufficiently rigorous demographic data, as there was no precise, current population census for these areas given the evident logistical difficulties and political turmoil. Remote-sensing techniques could provide a viable alternative to traditional demographic surveys in areas of limited accessibility and would improve our understanding of elephant interactions with other wildlife (De Merode et al. 2000). Some of the digital data may not be georeferenced, and ground control points will have to be obtained. Digitizing by hand is laborious and error prone, but often we found it to be the only way to incorporate certain types of data sets into a GIS. To digitize from hard copy successfully, at least four, and preferably more, ground control points were needed to georeference the digitized information properly.

Law-enforcement budget and elephant mortality

Two of the three predictor variables relating to the budget—the total law-enforcement budget and personal emoluments per guard per month—did not significantly influence the numbers of elephants found killed illegally (table 1). The optimum law-enforcement budget, which should result in no elephants being killed, is projected to be USD 97.33/km². This surprising result strongly contrasts with the USD 200/km² frequently cited in the literature (Cumming et al. 1984; Bell and Clarke 1985; Leader-Williams and Albon 1988). It is, however, consistent with the optimum law-enforcement budget obtained in the central Luangwa Valley, Zambia (Jachmann and Billiow 1997).

The park went through a difficult time from 1997 to 2001 when there was no performance-related bonus scheme. The number of elephants found killed illegally varied from 19 in 1999 to 4 in 2000 (Mushenzi 2002). The number found then rose sharply to 18 in 2001, due basically to the previous chief park warden and senior staff being dismissed and a new and experienced protected-area manager taking over. He firmly got his teeth into curbing elephant poaching and took stringent measures to protect wildlife. Despite the harsh conditions, dedicated game scouts continued their struggle and in recent times they managed to stop the amount of elephant poaching in ICCN-controlled sectors.

The first and most important predictor variable, the number of bonuses paid, did not increase from 2001, when the performance-related bonus was introduced, to 2003. Due to the one-year time lag, the average bonus did not appear to have a significant influence on the number of elephants found killed illegally.

The number of effective patrol days per square kilometre increased from 1.03 in January–June 2002 to 1.54 in January–June 2003. There was no significant difference in the number of elephants found killed illegally from 2000 to 2003, and poor coverage of the sector in June (fig. 2) was evident. Only one elephant killed illegally was detected in 2002 and another in June 2003. The large number of scout days carried out in 2002 slightly reduced poaching, through improved morale of the guard force and an increased amount of workforce during conflicts. This is the period when the performance-related bonus scheme from the United Nations Foundation and UNESCO project was at its height. As recommended by Jachmann (1998), efforts should be made to keep an acceptable minimum of between 10 and 13 effective days per scout per month to increase the patrol efficiency and frequency in the park.

Table 1. Variables relating to law-enforcement input, budget and number of elephants found killed illegally

Year	Elephants found killed	Budget (USD)		Law-enforcement input ^a	
		Law-enforce. expend./km ²	Personal bonuses/guard mo.	Effective patrol days/ km ²	Effective investigation days
2000 ^b	4	—	—	1.03	—
2001	18	73.22	24.01	2.06	—
2002	1	139.38	24.01	2.08	29
2003 ^b	1	79.39	0.00	1.54	47

^a 36.08 km² per guard

^b figures are from January to July

Elephant hunting situation after the 1989 ban

Building upon the monitoring results, the CITES ban on the trade in African ivory and subsequent price decreases have had a limited deterrent effect on the level of poaching in the northern sector of PNVi as a whole. There is an economic argument for why the ban did not totally halt poaching during the armed conflict. Many guns were in wrong hands, and poachers could take elephants for free. Elephants represented considerable capital, and traders were still paying for ivory. At the same time the country was in the throes of a terrible economic slump; thus any activity would have a low profit margin but still have participants. For years after the 1989 ban, the park was run on a hand-to-mouth basis before NGOs filled a vital gap covering material and technical aid that included transport, uniforms, food, aerial support, training and operational backup. The PNVi elephant population went from 830 animals in 1989 to about 650 in 2001 (Sikubwabo and Mubalama 2003).

Because of the severely deteriorating economy in eastern DRC people were willing to work for very low profit margins, significantly lower than in 1990, soon after the African ivory ban. During the study period, the cost to a poacher of taking an elephant was still extremely minimal, costing only for such items as shells and portage.

In addition, the effects of automatic weapons on PNVi's elephants is probably one of the best-documented case histories of a population collapse caused solely by poaching for both meat and ivory after the CITES ban. Qualitative reports suggest that the increase in elephant poaching following the wars and civil strife has been massive. It would be reasonable to assume that during the decade the number of men serving in the armed forces has more than trebled in the region. On several occasions, weapons were reported lost, stolen, taken from defeated soldiers, issued to militias, channelled secretly to *Mai Mai* militia movements, or simply traded by soldiers for money or goods. The result was that the price of an automatic rifle dropped drastically. A gun could cost from USD 100 to 120, cartridges from USD 0.80 to 1.00 each. Hundreds of rifles came into the hands of local people in that area and they began to poach. Many hunters used AK-47s obtained from the military barracks for which ammunition was in plentiful supply and difficult to control, especially during armed conflict.

The PNVi's elephant population cannot withstand a resurgence of the onslaught of the 1980s. Elephants need time to recover, not just in terms of overall numbers but also in terms of restoring their capability to fulfil their ecological function. Such a recovery might be rapid in some areas of the park but could take 10 to 20 years in areas that have suffered heavy poaching like the far northern sector, not yet under park management control.

Economic crisis and management constraints

Officially the economy of the region is in a state of disaster: exports cannot keep up with imports, industry barely functions and production lags, scarcities are rife, the infrastructure has deteriorated drastically, wages are at starvation level, and nothing works as it should. The reality is that despite the severe economic crisis, the population still finds the means to survive, often by slaughtering wildlife. Some people have thrived and become wealthy. Clearly the picture is not in the official reports; a great deal of economic activity is taking place outside the official system, as people take matters into their own hands, seeking to find ways to subsist. The illegal take of natural resources has expanded; such is the case with ivory (MacGaffey 1991).

Given the scale and unpredictability of the illegal exploitation of wildlife within the park, most of the park's resources are allocated to controlling poaching through armed patrols in the park, and providing the logistical support and infrastructure needed to maintain these patrols. The objectives of the strategy are to reduce the level of poaching and by doing so, enable wildlife populations to recover. Strategy effects cannot yet be measured given the lack of data on the status of faunal distribution and trends in wildlife populations on the whole ecosystem since the beginning of the civil war. About 51% of the protected area was under full control of park management, 26% was uncontrolled and 23% was accessible only through undercover expeditions (fig. 2).

Factors limiting the curbing of poaching

Several factors limit the curbing of poaching. There are two types of constraint; one is related to the lack of institutional support (political support), and the other includes everything that requires funding.

LACK OF INSTITUTIONAL AND ADMINISTRATIVE SUPPORT FROM GOVERNMENT

A concept of operation effective today might have to be adjusted to a changing situation. Offenders will likely adapt their method of operation according to the countermeasures law-enforcement personnel use. Increasingly illegal hunters operating in the park do not hesitate to attack law-enforcement personnel whenever they meet. Therefore, it is difficult to approach suspects, identify and question them, and take them into custody if there is reason to believe that they have committed an offence. Consequently, the threat has to be neutralized to ensure the safety of the investigating officer, and existing legal provisions may not cover such action. The ease of obtaining firearms and ammunition and the reported immunity from prosecution of big buyers because they enjoy political protection makes prosecution of poachers unlikely.

LACK OF MEANS OF LIVELIHOOD FOR LOCAL PEOPLE

The lack of cash income in the local economy, due to a massive decline in coffee production, the main economic activity, over the past two decades, had an immediate effect on local people. They need clothing, food and household goods, all of which are difficult to obtain under current economic conditions. Although a conservation policy exists, it has not been easy for park management to implement it because of political limitations and corruption. It is therefore a tragic twist of fate that poaching has been the easiest way to fill the vacuum.

LACK OF LOGISTICAL SUPPORT

A technical standard has been established for conducting field operations. How well it can be put into operation will depend on the capability of logistical support. This affects the type and duration of missions, which missions can be carried out, and the radius of their operation. If available resources are not sufficient to ensure reasonable logistical support, a reduction of the radius of operation must be accepted. Ensuring effective loss control within a reduced area is preferable to trying to cover a large area ineffectively. Lack of adequate logistical support will lead inevitably to a breakdown of operations or even to

mutiny. No matter how well trained and equipped the personnel, they cannot be effective if they cannot be deployed at the right time in the right place and if they cannot be backed up, due to lack of access. Constructing and maintaining infrastructure to ensure the mobility of surveillance units must be addressed. The cost for such projects is often prohibitive and implementing them technically difficult. Now is the time, with peace coming to DRC and more chance of support, to focus resources on combating these threats and rebuilding effective conservation measures for these outstanding and scenic areas of PNVi.

Opportunities and short-term perspectives

Questions are still being asked as to what are the most appropriate measures to counteract the decline in elephant numbers, what international support should be provided, and for how long. While attempts are being made to find the most viable solution both internationally and locally, what is undoubtedly true is that if the present rate of decline remains unchecked, the bulk of north PNVi's elephant populations will drop to unsustainable levels. If we want to close the time gap between international agreements taking effect and elephant survival, it is urgent that national and international efforts be redirected against these particular gangs and raiders.

NGO SUPPORT

Over the past 20 years or so, the number of elephants in the PNVi ecosystem has dropped from an estimated 800 in 1971 to fewer than 650 in 2001. While accepting that the present status of the elephant is alarming, we should also acknowledge the efforts that have been and continue to be directed in the parks towards conserving the species. Non-governmental organizations have recently placed appreciable emphasis on elephant conservation by helping ICCN strengthen law-enforcement units. More severe penalties are being imposed on convicted poachers. Looking at these efforts, one wonders why the species continues to become endangered. The explanation is simple: poaching. In addition, the high human population density puts great pressure on the protected area. Positive behaviour towards conservation needs to be cultivated among local communities living near the park.

STRENGTHENING THE 'STRIKE FORCE'

The strike force is a patrolling team that comes from headquarters to reinforce the anti-poaching effort at any particular patrol post when the limited force there needs help. Its efficacy depends on good communication and mobility. While the Zoological Society of London is providing radio capability adequate for the force's own operations, this facility must be supplemented by other radios, including hand-held VHF sets, to keep outposts in easy and reliable contact with the strike force. The strike force mounts armed patrols on a regular but unpredictable basis throughout the park. The expenditure of USD 97.33/km² is basically covered by partners, including the Dian Fossey Gorilla Fund-Europe, the Zoological Society of London and recently by a small grant from the IUCN/SSC African Elephant Specialist Group. Traditionally, laws have been enforced through a comprehensive array of ranger posts scattered strategically throughout the park, from which armed and unarmed guards mount patrols. The strike force consisting of different sections is based at park headquarters in Mutsora. Following recent training for the strike force, park management has decided that the Ishango subheadquarters will be reinforced with the various units being seconded there on a rotational basis.

REDESIGNING PRIORITIES

Elephants can be saved if a large portion of money now being used for research and counting is directed to law-enforcement activities. We are well aware of the limited operational capabilities of guards and the risks facing them out there in the bush due to lack of adequate equipment. In addition, they are subjected to poor living conditions in a harsh environment. A large portion of both donations and the government budget for conservation should be used to provide the equipment needed for law-enforcement operations: reliable field vehicles, two-way radios, modern automatic weapons and uniforms. A comprehensive training and recruitment programme for rangers and their field officers must be given priority and funded, given the current lack of expertise. The social welfare of these people needs to be improved by providing them with good housing, clean water and health care. Remuneration packages should give them good prospects and provide an incentive to do the

work well.

We are in no way opposed to scientific research or regular surveys of wildlife populations. We need such information to demonstrate trends over time and thus to formulate appropriate conservation and management strategies to secure elephants' future. But given the present appalling situation, continuing the annual population surveys will deplete the limited resources that otherwise can be used to save the elephants. With so many firearms currently concentrated within and outside the park and the general lack of security, the future of these pachyderms is bleak unless far more stringent law enforcement is put in place. Because conservation strategies for the PNVi elephant populations are underfunded, attention must focus on the single devastating factor—poaching—or else our surveys will simply compile information that will be used to write a history of a once abundant but now extinct keystone species.

NEED FOR POLITICAL WILL

Together with this appeal to spend more on law enforcement and less on fundamental research and population surveys, there is a need to look more deeply into the entire issue of poaching. At the moment, poachers once arrested are prosecuted as individuals. In reality, elephant poachers do not operate singly, and other figures behind the scenes, often key members of the operation from the initial planning stage to the final selling of the ivory, are neither investigated nor subjected to judicial proceedings. If elephant poaching is to be eradicated, law-enforcement efforts must also aim at bringing these people to book. Wardens and park guards alone cannot achieve this. Other government departments must be involved, such as the general police force, the criminal investigations department, the judiciary, customs and excise, the intelligence services and the general public. As Boshe (1989) pointed out, 'If our anti-poaching efforts capture the "artillery-men" of the enemy in this war, then their "infantry" will be paralysed, and we will have won the battle'.

The current situation in northern PNVi is being actively and urgently addressed by an emergency strategy developed jointly at the park and approved by ICCN headquarters in Kinshasa. The main objectives are to tackle poaching, prevent any more deaths of *Key* species and allow numbers to rebuild before it

is too late, then gradually gain control of the whole park by

- developing and implementing a full-scale effective training and retraining operation from the training base at Ishango
- revising and implementing an effective law-enforcement strategy to protect the elephant population in the immediate term and to regain control of the whole park in the long term
- providing technical, logistical, maintenance, equipment and ration support necessary, increasing aerial support, raising awareness and support on the basis of successful actions such as detailed intelligence work outside conservation areas
- carrying out a major diplomatic and pressure initiative to inform the Uganda hierarchy and UN peacekeeping forces of the true situation and request their action and appropriate support
- ensuring the availability of continuous information on elephant status and numbers, which is vital for the effective conservation and management of PNVi's remaining elephant population
- increasing communication and collaboration with the surrounding communities and encouraging local diplomatic initiatives (Hillman Smith et al. 2003b).

Until these objectives are achieved the onus remains with the NGOs to continue their vigilance and monitoring of the law-enforcement survey work.

Conclusion and recommendations

Monitoring illegal activity and relating it to patrol effort makes it possible to assess which sectors or areas and which seasons are most affected by which types of illegal wildlife use. Since the three most important variables considered in the search area—visibility, habitat and weather—can change many times on a single patrol, we recommend recording them regularly and including them in the observations table of the form. Given the project time limitation of one year, we did not collect enough information to allow us to establish trends per area and season statistically or to make major distinctions in illegal killing of wildlife between serious offences that were directly related to the illegal killing of elephants and minor offences that may or may not have been related to the illegal killing.

Ideally each patrol should use a GPS to record its movements and observations, as an important meas-

urement is patrol coverage and patrol frequency. Therefore, we recommend that the GPS units used for the pilot project be taken to PNVi north to be used for the standardized data reporting system and that data be analysed on population trends, patterns of effort, and factors that influence illegal killing.

Wildlife conservation laws have become stricter and increasingly more difficult to enforce during the last few decades due to three major factors: 1) a decline in the number of wild animals as a result of over-exploitation and the destruction of their habitat by humans; 2) the attractive market prices offered for some trophies; and 3) an increasing shortage of human food, particularly meat.

Poaching in the northern sector of PNVi cannot be stopped simply by increasing the number of uniformed wildlife law-enforcement officers or by supplying them with more automatic weapons and ammunition. Evaluation of law-enforcement methods indicates that for serious offences the most effective method is investigation based on detailed intelligence work outside the park. A high intensity of regular patrolling in priority areas is required to curb minor offences. Increased effectiveness in anti-poaching can be achieved only by appropriate law enforcement as a deterrent. The site manager needs information that can be used to determine optimum allocation of resources and improve the protection and management of elephants and other wildlife. An important point is that elaborate equipment such as 4-wheel-drive vehicles, hand-held VHF sets, aircraft and even tents can increase the effectiveness of a field force by synergizing and increasing mobility of troops on the ground. This fact remains important in assessing project submissions in the near future.

If CITES and the DRC government do not improve and enforce wildlife laws and decrees, ivory markets and buyers will continue to claim the lives of many African elephants. Because of the threats faced, more resources should be set aside by the re-emerging nation for wildlife protection, and intensive air and ground patrols should be carried out continuously to monitor the status of keystone species, including elephant. In addition, we urge the national government to consider signing the Lusaka Agreement on Cooperative Enforcements Directed at Illegal Trade in Wild Fauna and Flora to combat from top to bottom and ultimately eliminate illegal international trafficking in African wildlife, all the more so since this agreement provides a legal basis for co-

operative law enforcement so far achieved nowhere else in the world. From that prospect, there is also a clear need for coordinated surveillance efforts across PNVi and Queen Elizabeth National Park in Uganda, to identify the true range and size of the elephant population within these two protected areas.

Lastly, we applaud the recent statement in Conf.10.10 (Rev. CoP 12) that the monitoring system should encompass capacity building in range states to provide information that will facilitate elephant management, and to prioritize enforcement initiatives and protection. The objectives are to measure and record levels and trends of illegal hunting and trade and to establish an information base to support appropriate management, protection and enforcement needs.

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