

Chapter 5

Anthropological contributions to protected area management

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The challenges of protected area management are now widely acknowledged as being both ecological and social. Anthropology, a field with subfields that span natural and social science approaches and methods, has had a long history of engagement in the study of human–environment relationships. We will argue in this chapter that anthropology, and particularly collaborative, cross-subfield practices of anthropology, can be well suited to improving protected area management (see also Brosius, 2006; West and Brockington, 2006). It captures nuances and variations in formal and informal or illicit resource use patterns by both humans and animals over time, and helps trace the cultural and the ecological significance of such patterns. This, in turn, can enable more intelligent formulation of policy for complex multi-use sites. Fine-grained and long-term anthropological studies enhance our understanding of micro-regional shifts in density, ecology, and behaviour and how to put these insights into practice for conservation.

Increasingly, anthropologists trace the relevance of community institutions for understanding the larger domains of public institutions, the private sector, and the State. This generation of anthropologists is studying not 'primitives' but, rather, the sorts of tourists, experts, and managers who formulate and implement conservation policies. We can now look through an anthropological lens at the problem of integrating science into policy – to address the flow problems blocking information transfer between scientific and policy domains which, to date, have never been resolved. In deployment of available information to policy, anthropology is uniquely positioned to contribute to three essential aspects of conservation:

- understanding the historical and contemporary influences on the changing animal–human relationship;
- understanding cultural impediments to conservation policy; and
- understanding impediments to conservation policy in international policy agendas.

Today, a range of work falls within the broad rubric of environmental anthropology, and the field bears traces of many approaches within and across the older ecological anthropology, political ecology, and others (Orlove, 1980; Peet and Watts, 1996; Fairhead and Leach, 1996; Kottak, 1999; Brosius, 1999) while combining them in new ways, and moving beyond them into new practical and critical terrain. A growing corpus of long-term, fine-grained ethnographic and ecological fieldwork and cross-cultural and cross-species approaches are well suited for addressing issues of biodiversity and current debates on how

to improve conservation approaches (Milton, 1993; Orlove and Brush, 1996; Sponsel *et al.*, 1996; Fuentes and Wolfe, 2002; Paterson and Wallis, 2005).

Further, the practice of anthropological research complements the development of management concepts. Drawing on insights from our own ongoing research in the Dzanga-Sangha Dense Forest Reserve (RDS) in south-western Central African Republic (CAR) we will illustrate the relevance of this 'basic' research to management issues. We will suggest first how anthropological analysis advances our understandings of *integrated conservation and development*; second, how subtle change in animal and human forest use for monitoring and evaluation can work within *adaptive frameworks*; third, we will consider how its field-based partnerships can serve within complex local communities to improve *conservation capacity*; and, finally, we will explore how anthropology's attention to intersections of symbolic and material economies provides a broad framework for contemplating particular species in transnational as well as local contexts as *cross-cultural and ecological keystones*.

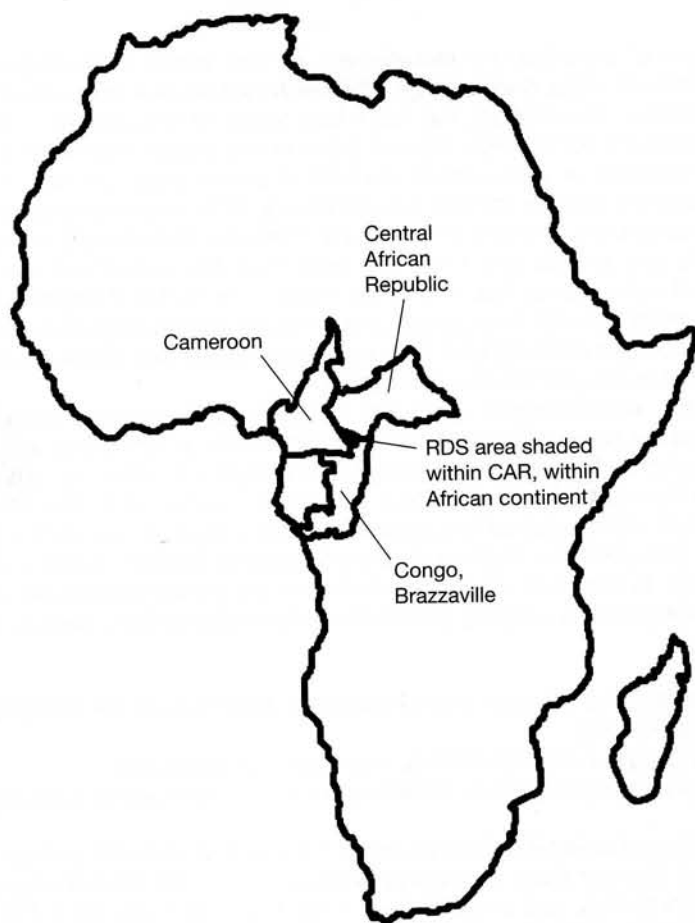


Figure 5.1 Central African Republic and the Dzanga-Sangha Reserve within the context of Central Africa. It is flanked by two other protected areas that together make up the Tri-National Sangha River Protected Area Complex

The Dzanga-Sangha Special Reserve, Central African Republic

The RDS is one of the most recent protected areas established in CAR, and one of only two sizeable forest reserves in that country. Initial estimates of forest animals' population density indicated that elephants and gorillas are more abundant per square kilometre than are humans in this part of the world (Carroll, 1988; Fay, 1989). Abundant large clearings in the forest enable wildlife viewing (and hunting), but also access to trees and other resources. The area, thus, now supports several rival economies including local community hunting and gathering, alongside international timber extraction, nature tourism, scientific research, and safari hunting (Osaki and Abbaté, 1995).

Dzanga-Sangha's principal tourist attraction is one of the large saline clearings in the region, called Dzanga. It is 'maintained' by the activity of the elephants that fell trees and visit in large numbers to use the marshy clearing and its streams as a source of minerals, for mud baths, and socializing. Initial estimates of forest animals' population density in the area indicated that elephants (*Loxodonta africana cyclotis*) and gorillas (*Gorilla gorilla gorilla*) were more abundant per square kilometre than are humans (Carroll 1988; Fay 1989). Since these early censuses, ongoing ecological monitoring has been initiated in the interest of assuring preservation of the wildlife (Blom *et al.*, 2004b).

The current Reserve is in an area that was previously logged by several generations of transnational logging interests.¹ Since 1990, the study region has been designated a forest reserve with multiple sub-sectors. Initially intending to replace a logging economy in the area, conservation professionals have, instead, had to contend with remarkable rivalry from loggers over the past three decades. Recent logging activities appear to be escalating forest fragmentation and more minor edge effects that had resulted from the initial road building efforts in the 1980s, and create a perpetual backdrop of change that makes forest conservation efforts all the more urgent (Hardin and Remis, 2006).

Reserve regulations

The RDS National Park and Reserve were gazetted in 1990, but conservation and anti-poaching activities began in the area in 1987, through training of guards and the initiation of regular patrols for the enforcement of national hunting codes. At present, the Central African government, in conjunction with the WWF and the GTZ,² manages the protected area through a series of fairly complex interior regulations intended to govern human activity differently in several separate sectors (see Figure 5.2). RDS policy is intended to favour the continued existence of hunting and gathering lifestyles for forest residents, whose use of the forest has, in fact, been constrained by the advent of conservation measures. As such, revenues generated by forest use by outsiders in growing local industries of ecotourism and trophy hunting are distributed among residents. For example, under the Reserve's interior regulations (approved in 1991), about 90 per cent of tourism revenues remain within the Reserve, although, to date, tourism has not generated as much income as hoped (Blom, 2000). While these revenues provide new options for some residents, many have mixed feelings about the fact that the national park area is currently off limits for all activities save research, tourism, and education. These issues pose the most difficult challenge to sustainable use in the region, and are intimately bound up with the history of logging. Within the multiple-use managed hunting sector, however, gathering and traditional spear, cross-bow, and net hunts, as well as regulated shotgun hunting of less vulnerable species, are all permitted.

Legal access to core areas, and even to hunting within buffer areas, has become easiest for foreigners and for certain elites. Codes pertaining to firearms favour hunting by those, usually not long-term, residents who have the financial, educational, and political resources to seek and purchase legal permits and hunting quotas. In addition, annual quotas are currently allotted by the national government to foreign safari hunting tour operators, which

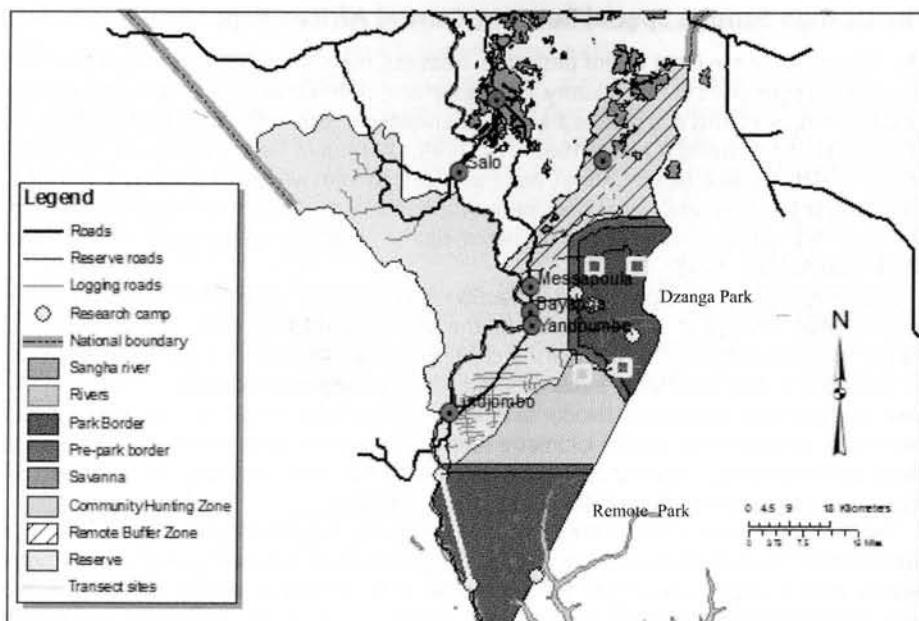


Figure 5.2 Dzanga-Sangha Reserve Study Sectors, Central African Republic. Towns appear as circles. Research camps, study sites, and blocks appear in yellow

operate in the area only about five to six months out of each year, leaving 'their' sectors somewhat open to part-time multiple uses by locals. Activity has proliferated in the area, luring further immigrants and altering the frequency with which, and conditions under which, humans and animals interact.

As of this writing, conservation activities have likely prevented the sorts of local extinctions of wildlife experienced in towns further north and south of CAR. The use of wire cable snares and the killing of elephants, gorillas, chimpanzees (*Pan troglodytes troglodytes*), leopards (*Panthera pardus*), and other vulnerable species are outlawed throughout the country (Carroll, 1998). But such legal restrictions are not always effectively enforced, due to demand for leisure hunting by national and international elites, or for wild game meat to feed growing communities in the area (Wilkie and Carpenter, 1999).

Overall, protection of wildlife is still far from equitably and efficiently accomplished in the RDS area. Management practices intended to safeguard subsistence hunting and gathering against the growth of commercial markets are imperfectly applied. Infractions persist, requiring constant fine-tuning of the system. In addition, as we have suggested, certain inequitable relations of access are embedded in the very basic assumptions of the rules and codes. Some Reserve residents are prevented from using the most efficient and powerful technologies to hunt and gather, while others are enabled to extract more efficiently for profit.

Reserve residents

In the Dzanga-Sangha Reserve area, the BaAka (Pygmy) foragers and their non-BaAka neighbours, locally known as 'Bilos', have linked histories of migration, subsistence, and labour in colonial regimes, despite speaking different languages. The terms 'villagers' and 'farmers' no longer provide meaningful distinctions, as many BaAka also live in villages, at

least part of the time, and plant fields of their own (Kretsinger and Hardin, 2003). The first residents of the Reserve's largest town, Bayanga, appear to have been groups of horticulturalists-fishers-traders who settled on the banks of the Sangha River during the upheaval of colonial exploration and initial trades in ivory and other animal products at the turn of the twentieth century (Hardin, 2000). Each of these commodity cycles transformed migration patterns and landscapes; each had experienced booms, then busts (see also Barnes, 2002). Like these colonial companies, today's logging operations have been suspended and then resumed in recent years. Nevertheless, the demand for tropical wood on world markets has made logging the major industry in the area for the past three decades. Thus, Bilos and BaAka who have – or historically had – hereditary trade relations now experience professionalization and commodification of work in the forest.

As diamond towns in south-western CAR such as Nola and Berberati have grown, independent communities such as that of Babongo, just north of Bayanga within the Reserve, have settled defiantly on the outskirts of such booming economic activity, continuing to live a largely autonomous lifestyle based on combining horticulture, trapping, fishing, and other uses of the abundant natural resources, with occasional wage labour in regional industries. This accounts, in part, for their fierce opposition to strict park management which, to them, seems to curtail their activities.

The RDS Reserve was established as a protected area that would contain and contribute to the livelihoods of its inhabitants in an area that contains many temporary and permanent human settlements. The largest is the town of Bayanga, whose population was estimated at 5,000 in 2001 but had fluctuated between approximately 1,000 (1988) and as many as 10,000 (2004) in association with changes in the local economy (Loudiyi, 1995; Noss, 2000; Carroll, pers. comm., RDS project records). Bayanga's first and most recent influx of immigrants came to work at the sawmill. More recent immigrants have been attracted by the promise of rich natural resources or employment in the protected area. Babongo, ten kilometres north of Bayanga, is one of the longer established and least ethnically diverse villages in the region. In recent years some of the strongest oppositions to conservation and highest numbers of elephant poachers have come from this village. Flanked by both a logging company and a nature tourism and Reserve administration complex, the neighbourhoods of Bayanga are filled with a variety of local people who work in one or both of these major local industries.

A tendency for BaAka to now remain roadside is only reinforced by the construction of schools, wells, and other development initiatives carried out by the RDS administration in roadside 'villages' such as Yandoumbé and Messapoula. Yet, BaAka continue to use the forest as both a natural and a cultural resource. The majority of households in Bayanga were involved in hunting activities in 2002, according to a rapid survey commissioned by World Wildlife Fund at RDS in 2002 (Ghiurghi and Lakara, 2002). When in the forest, they remain dependent on the abundance of wild game and plant resources not only for nutrition, but also for certain senses of identity and independence from wage labour. It is in this sense that the decline in game meat species can be considered a crisis, not only for animal populations, but among those humans who depend upon them.

Forest wildlife: fluctuating responses to human activities

Gorillas are traditionally hunted in this region, and play an increasingly large role in the bushmeat trade (Bowen-Jones, 1999; Auzel and Wilkie, 2000; Peterson and Ammann, 2004). This commercial trade increases in logging zones in the region (Robinson *et al.*, 1999), and is also becoming more visible at RDS, largely linked to the role of in-migrant hunters and traders (Daspit and Remis, unpublished). Gorilla abundance has been found to be inversely correlated with human disturbance at other sites, and even during some of our earlier census years at RDS (Remis, 2000). Nevertheless, our 2005 data show this relationship has broken

down and yielded to spatial diversification of human and gorilla activities across sectors at RDS. Now both humans and gorillas concentrate their activities and navigate along the grid of recently opened logging roads. While many other primates and other mammals decline with logging (Struhsaker, 1997; Chapman *et al.*, 2000), we have been both surprised and dismayed at the high amount of gorilla feeding signs and nests in recently logged zones that are herb rich but also bustling with human activity and snares (also Laurance *et al.*, 2006). Gorillas appear to be sometimes, temporarily, able to co-exist with intense human activity. Unfortunately, our longitudinal data suggest that gorillas' proximity to hunters along roadsides proves to be risky for them once other more preferred prey decline (Blom, 2005; Remis *et al.*, 2006). This vulnerability, even within protected areas, exacerbates consequences of looming threats of Ebola and other disease outbreaks for gorilla populations as a whole (Wallis and Rick, 1999; Walsh *et al.*, 2003).

During initial surveys of the RDS area (using methods articulated in Tutin and Fernandez, 1984; White and Edwards, 1999; Remis, 2000), gorillas were found to be much more numerous than chimpanzees, a pattern found elsewhere in other selectively logged forests in the region (Carroll, 1988). In 1985, the highest density of gorilla nests in the Dzanga region was along abandoned logging roads (Carroll, 1988). But herbs decline with forest succession, and four to six years later gorillas had shifted their activities away from the roads (Remis, 1997). Thus, any logging-related increases in herbaceous resources for gorillas are temporary; these foods decline before gorillas, with their slow reproductive rates, respond. Unlike gorillas, chimpanzees decline after logging at most sites across Africa. At Lope chimpanzees attempted to move out of areas being actively logged; but those fleeing a logging zone are likely to be exterminated by a neighbouring chimpanzee community (White and Tutin, 2001). Long-term multidisciplinary field studies are essential in order to understand the full effects of logging on apes, and to make predictions about long-term population stability.

Recent studies of elephant mobility in this region indicate that they migrate across international borders and over remarkably long distances to visit the Dzanga saline (Turkalo and Fay, 1996; Blake and Hedges 2004). After the conception of the Reserve, and local enforcement of anti-poaching laws, there was a community perception of increase in elephant activity in Bayanga and its surrounding agricultural fields and forests (Kamiss and Turkalo, 1999). It is interesting to wonder whether, in those initial years, elephants were concentrating their activities within Dzanga, relative to more heavily hunted zones outside of the core protected area; but any such benefits of the Reserve may have been short-lived. In recent years there has been a marked decline in elephant abundance and activity within Bayanga and its surrounds (Remis, 2002); though elephants continue to use the Dzanga clearing many of their major paths in the neighbouring community hunting sector have now grown over (Remis *et al.*, 2006).

Like the elephants and gorillas, other herbivores including forest buffalo (*Caffir nanus*), sitatunga (*Tragelaphus spekei*), several species of duiker (*Cephalophus*), giant forest hogs (*Hylocherus meinertzhageni*), and bush pigs (*Potamochoerus porcus*) may also use the streams, sunbathe, and graze on tender re-growth vegetation in the clearings around Dzanga and on recently opened logging roads in the region. Ironically these 'benefits' of light levels of selective logging likely increase the vulnerability of all of these species to the human hunters who use the grid of logging roads as arteries from which to enter the forest and launch their hunting activities (Blom, 2005). It is more efficient to move quickly along these open roads and hunters more easily locate fresh animal trails here than in dense low-visibility forest where travel is cumbersome. Likewise, those tracking wildlife for ecotourism and research also benefit from the road grid and clearings that provide both wildlife viewing and hunting opportunities. The abundance of elephants and other wildlife were negatively correlated with proximity to secondary logging roads at RDS and in Southern Gabon (Laurance, 1995; Blom, 2005; Laurance *et al.*, 2006).

Collaborative anthropological research at RDS

We have studied changing human perceptions and uses of the forest within this protected area, focusing here primarily on life in, and work within, hunting camps and spatial patterning of wildlife abundance in the same sectors. We have documented in more detail elsewhere some of the changes that the aforementioned policies and political economic developments have made in the abilities of families to meet their needs in the forest (Hardin and Remis, 2006). These changes include, most notably, spatial shifts in, and intensification of, hunting and gathering as people are integrated into larger commercial economies. Heterogeneity in hunting practices in different zones and change over time have worked to reduce wildlife populations across multiple sectors, especially duikers, which are the preferred prey in the region (Eves and Ruggiero, 2000; Remis *et al.*, 2006).

With respect to wildlife, we focus here on shifts in behaviour and abundance of two species that are of ecological and symbolic significance to all stakeholders and even visitors in the area: elephants and gorillas. We have noted elsewhere that research and conservation can have positive effects for animals and humans, valorizing expert tracking, and creating interesting cross-cultural rapport among people as they interact with wildlife (Hardin, 2000). Our present work shows animals and humans responding to different ecological and economic pressures differently in different sectors over time, such as between buffer and core but also North/South, logging/tourism and overlap areas where multiple economic activities are booming at one time. We will briefly summarize those results here, in four different sectors of the protected area, providing very condensed accounts of the individuals, groups, and animals with which we worked in each sector.

Core Park Sites for research, tourism, and protection

The Core Dzanga Sector Park area is generally richer in wildlife than the other sectors studied. Elephant sign, gorilla nests and duiker sign were all very common in our initial 1997 census, as well as earlier censuses (Remis, 2000). Currently most visible human activities on transects around the primary research sites in this sector appear to be related to research and tourism, in accordance with Park and Reserve regulations, but hunters do disregard interdictions fairly widely and are regularly encountered here by researchers and guards. Transects at sites less centrally located within the core park reveal heavy poaching pressure. By 2005, gorilla, elephant, and duiker abundances were reduced there relative to the better protected Core Park Sites (Figure 5.3).

The Dzanga clearing serves as a major tourist attraction and research site at Dzanga-Sangha (Figure 5.2). Its elevated platforms afford safe, reliable wildlife viewing, though visitors do need to walk two kilometres along elephant paths to get there. The long-term success of much of the other research and tourism here, as in other parks, depends on successful habituation of gorillas to the presence of humans. This process takes many years (Blom *et al.*, 2004a), and even once achieved does not guarantee the safety of the animals or their continued availability for viewing (Butinski and Kalina, 1998). For example, gorilla research and ecotourism have been disrupted after silverbacks from habituated groups have died following aggressive encounters with other males. Chimpanzees and gorillas routinely endure close contact with researchers or tourists; in one of the most unfortunate cases this has led to the death of a young gorilla at RDS who fell while fleeing from a party of well-intentioned tourists. Nevertheless, the sometimes negative impacts of conservation and research-related incidents cannot compare with the wholesale slaughter of apes that occurs in 'hotspots' of bushmeat extraction that most often accompany the extension of logging into remote forest areas (Rose *et al.*, 2003).

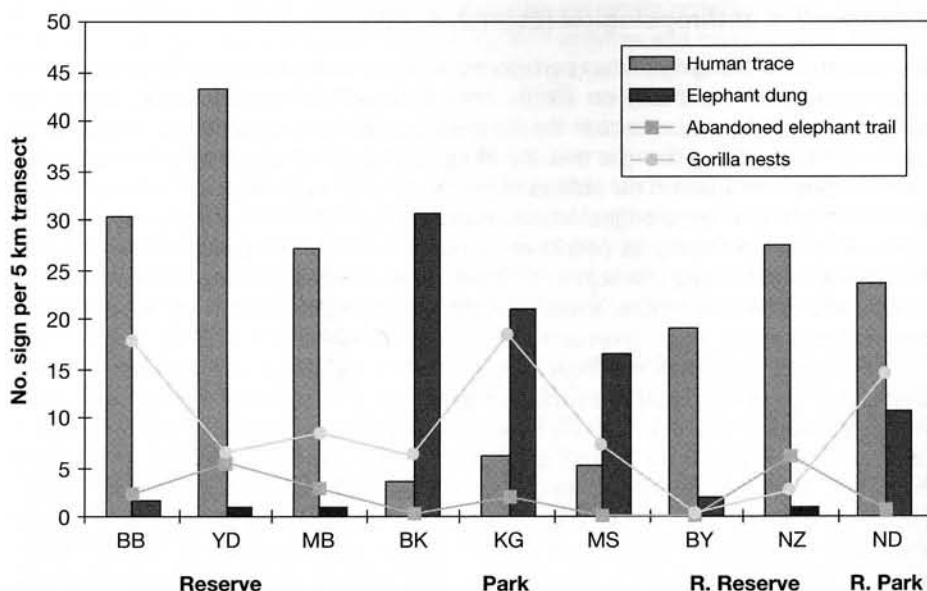


Figure 5.3 Gorilla and elephant sign in relationship to human activity by site at RDS, Central African Republic, 2005. The nine sites along the x-axis increase in distance from the main town of Bayanga. Babango (BB), Youndombe (YD), and Mabongo (MB) are Core Reserve Sites. Bakombe (BK), Kongana (KG), and Messapoula (MS) are Core Park Sites. Beyobe (BY) and Nzoboko (NZ) are Remote Reserve Sites, and Ndoki (ND) is the Remote Park Site

Buffer Zone: dynamics of diverse subsistence and scarcity

The BaAka hunting camp we visited in the community hunting zone in 1997 was small and intimate, though surrounded by a dense network of paths of other human users of the forest. Demand by local, regional, and national elites, as well as foreign tourist desires, are the latest forces contributing to the fabulous variety of hunting techniques among the BaAka in this sector. Even in 1997, the camp was a remarkably complete living 'museum' of hunting and gathering practices adopted and adapted from a range of interpenetrating influences over time, a stark contrast with the more limited repertoires of neighbouring regions. Despite declining wildlife, BaAka have since varied and intensified their harvesting strategies to take advantage of commercial opportunities provided by tourists or regional game markets (see Hardin, 2000; Remis, 2000; Noss and Hewlett, 2001). Net-hunts have more participants and can travel by truck to less-disturbed sectors when travelling with tourists, likely increasing their yields. By 2002 and 2005 the heaviest sector of human activity in the Buffer Zone had shifted several kilometres to the east, logged in 2002, and the site of a 32-hut BaAka camp that was geared for commercial hunting and trade.

The community hunting zone transect sites had the lowest elephant abundance across censuses, likely due to high human presence (Figure 5.3). Lack of elephant activity in the area has actually been a boon to BaAka who have cultivated fields for the first time since moving to Youndombe. Agriculture and logging impact habitat quality for wildlife (Laurance, 1995; Struhsaker, 1997). Logging temporarily increases forest resource availability for gorillas (Remis, 1997; Malcolm and Ray, 2000). We have twice observed the pattern of simultaneous increases in human hunting and gorilla nesting and feeding in herb-rich recently logged sites followed by a decline once more preferred game species are reduced in these areas.

BaAka elders recognize the influence of others on their community, and the ever-harder work of hunting due to scarcity of overexploited game (Hardin and Remis, 2006). Our longitudinal study suggests that initial adaptive responses to such changes may permit certain animal populations, including gorillas and elephants, to maintain themselves, at least initially. But it also suggests that if such diverse regimes of forest use persist, animal populations encounter a threshold beyond which they plummet, in effect 'stranding' those humans who depend upon them as economic and cultural keystone resources.

In 1997, we visited another, more remote, Buffer Zone site, on the Park border. Kongana is permanently staffed by conservation guards but their presence has not prevented others from seeking perceived opportunities provided by protection in this sector. During our stay, camp life was intense: 38 individuals worked together, smoking up to 20 animal carcasses at one time and staying awake almost through the night to finish baskets for the transport of meat to market. Despite the mixed strategies of exploitation and protection co-occurring at this park border site (KG), human sign on transects is relatively rare. Wildlife populations remain more intact here than other study sectors closer to town (BB, MB, YD), but even here gorilla nest numbers and group sizes were reduced in 2002 and 2005 relative to previous years (Figure 5.3; Remis, 2000; Remis *et al.*, 2006).

Remote Park Sector at RDS

To the south of Bayanga is a fascinating stretch of the Sangha River, dotted with logging towns that boom, then bust, leaving behind the skeletal remains of hangars, mills, and villas. They also leave behind a small but fierce breed of African merchants who run small commercial stores, as well as running diamonds, ivory, and other resources from the inner forests out through their merchant networks to larger towns such as Douala. This area of the Sangha, which flows from southern CAR into northern Congo Brazzaville, is ethnographically and ecologically under-documented, but is becoming crucial from a conservation perspective. Because this area has long been 'the end of the road' where northern and southern trade networks do not quite meet, it has long been a haven for animals and for particular groups of people. For instance, groups of 'Sangha Sangha' fishermen and horticulturalists, who seek refuge from government and other controls on their activities in order to live by their own views of subsistence, call the area their own. Other inhabitants include former combatants in the Congolese opposition, who seek to remain under the radar of the current government.

Elephant abundance had been low in the southern Ndoki sector during a 1986 census, largely attributed at that time to high numbers of poachers in the area (Fay, 1989, 1991). Elephant protection has since increased in the Remote Park area of RDS since the original survey, with the ivory ban and creation of the Tri-National protected areas in this border region of Cameroon, Congo, and CAR (Blake, 2005). Now, elephants are more numerous in this southern sector, while their numbers have declined dramatically in community hunting zones close and far from Bayanga (Figure 5.3). Nevertheless, during our census work in this sector in 2005 we encountered numerous hunting camps and abandoned elephant carcasses whose tusks had been removed, suggesting the rebound in their numbers will be short-lived (Remis *et al.*, 2006). Gorillas are also apparently targeted by hunters in this area. Fay (1989) found the number of gorilla nests per kilometre in Ndoki sector in 1986 to be 3.1. Average group size at nest sites was 3.9. In 2005, in this sector we found only 2.8 gorilla nests per kilometre, with a reduced average group size of only 1.4.

Remote Buffer Zone: intersection of wildlife, diamonds, and safari hunting

Much about Dzanga-Sangha's real economy remains impossible to quantify, or even to accurately estimate. An ethnographic perspective can be extremely useful for discerning

networks and commodity flows about which people are unlikely to respond in a survey format. For instance, let us take the widow of a former sawmill worker who settled in the region several years ago and was involved in a national trial in 1995. She had been discovered hoarding nearly 80 elephant tusks in the latrine behind her house. She claims rights to contraband local forest resources due to her 'precarious' economic condition, her gender, her Central African nationality, and her long residence in the region. She avidly manipulates non-local kin networks for transport or commercial aid via government and logging company connections, and is a widely acknowledged master at network management.

Africans from further north (Chad, Mauritania, Senegal) also get along well with the widow in question. They are, as she is, part of a group of African 'expatriates' in the region. They participate in public transport networks that span the country of CAR, thereby also enabling the lucrative flows of illegal animal products, diamonds, and arms and ammunition across international borders (CITES report, 2005). Their trade presents both opportunities and threats to the fabric of Bayanga's social life, dependent as it is on a rich and varied resource base that these African outsiders, like so many Europeans, are using for private profit.

The diamond trade that has flourished to the north of Bayanga represents intricate interpenetrations of regionally rooted communities. As with tourism, it would not have been able to flourish as easily without the road networks and light plane traffic that the base economy of logging has provided. The settlement of many BaAka on mission stations immediately to the north of the Reserve area has also facilitated labour and a ready supply of agricultural produce and game meat for alluvial diamond fields.

During our census work in this Remote Buffer Zone sector we surveyed areas adjacent to the safari hunting concession at the Libwe clearing and the location of a diamond hunting village which predates the creation of the Reserve but has now grown to contain perhaps more than 500 people. During our 2005 census, abandoned elephant trails, low elephant dung abundance, low gorilla nest abundance, and small gorilla group sizes all confirm the very high levels of extraction here (BY and NZ sites, Figure 5.3), and low levels of anti-poaching patrols or sanctions, despite its status within the Reserve borders. Further confirming a long-term pattern of extreme game scarcity distinct from other RDS sectors, we found evidence that hunters here have diversified their prey species; there were rat traps on transects, and hornbill and bat carcasses on smoking racks. Hunters who tried to hold our research team hostage (mistaking them for Park guards) also bemoaned the scarcity of large mammalian prey.

Toward an anthropology of protected area management

Over the past two decades RDS has been managed as an integrated conservation and development project (ICDP) with multiple-use zones. Yet our results suggest that conservation and development are not, in fact, integrated, but actually compete here within separate zones within the reserve, as though parallel logging and conservation concessions. This experiment in co-existence yields interesting results that can provide insight for protected area management in Africa and elsewhere.

Management challenges at RDS include growing in-migration due to ongoing logging activities and a growing conservation and research sector; and flourishing, largely illicit commercial trades that span the Reserve area, connecting it to broader national and regional economic circuits for the exchange of meat, arms and ammunition, and diamonds (TRAFFIC, 2005). To better understand and respond to these major management challenges, conservation initiatives must integrate more comprehensive monitoring and assessment of complex human and animal populations. Anthropological approaches can focus such monitoring on changes in behaviour by animals and people within protected areas, but also on cultural, political, economic, and ecological trends or shifts that can structure their behaviour.

A multi-factored approach to ecological, social, and demographic influences on wildlife behaviour illustrates how these micro-level factors articulate with management forms over time. This type of fine-grained analysis reminds us to be mindful of the importance of the continued viability of wildlife populations, even as we pursue management experiments. Although our 1997 wildlife surveys suggested gorilla populations were initially holding their own in areas of high human activity in the RDS Reserve sectors, more recent wildlife surveys there suggest declines in gorillas and other species. Elephants, in particular, have declined dramatically at RDS, from an average of 8.15 dung per kilometre along pre-1990 transects (Carroll, 1988; Fay, 1989) to a mean of only 1.39 dung per kilometre in 2005 (see Remis and Hardin, in prep.). These and other studies further emphasize indications of hunting sign and vulnerability for most wildlife even within the Core Park Sectors at RDS (Blom, 2005; Blake, 2005; Hardin and Remis, 2006).

Implications for specific wildlife species

Another clear contradiction stands out: that between local perceptions of the protected area as a reserve of prey for difficult economic times, and the perceptions of non-local managers and leisure users of the protected area as a space for conservation of global patrimony toward education and experiential enrichment of many (Kellert, 1995; also Sicotte and Uwengeli, 2002). These larger perceptual issues can be linked analytically to behavioural and density issues, especially with respect to elephants. When evaluating the effectiveness of conservation programmes, increases in elephant vulnerability to hunting within the core of protected areas are particularly troubling. Recent MIKE (Monitoring the Illegal Killing of Elephants) surveys detected numerous poached elephant carcasses and poachers camps in the heart of the Park sector around the Dzanga saline where elephant abundance is the highest (Blake, 2005). Further, reports of increased nervousness when humans are scented, and aggressiveness of elephants in the Core Park Sector at RDS, also suggest that elephant vulnerability has increased. The Elephant Trade Information System documents that after an initial decline international trade in ivory has increased from 1995 onwards and signalled Cameroon and DRC as two of the most important players in the internal illicit trade in ivory. Southern CAR is implicated as a major source country for Cameroon (Blake, 2005; TRAFFIC no. 23 February 2005, accessed at www.traffic.org/dispatches/DispNo23.pdf).

Even researchers with long experience in perceiving and responding to elephants have been vulnerable to persistent pursuit or attack at RDS this past year. In the worst of a series of recent elephant charges, a student gorilla researcher was seriously injured at the Bai Hokou tourist site (Carroll, pers. comm.). This also heightens concern for tourists in the region, who must walk two kilometres along elephant paths through 'elephant infested' forest (as Delia Akeley once said) to reach the safety of the Dzanga saline tourist viewing platform. In order for ecotourism to be wisely or successfully implemented, basic safety must be assured for wildlife, park staff, and tourists alike through effective conservation measures.

At sites in the Buffer Zone, wire snare and firearm hunting co-exists with longer-term net hunting, and plant or honey gathering activities, albeit in varying proportions. Chimpanzee nests and nest-sites are rare, possibly related to habitat structure, hunting or logging, and road infrastructure-related loss of large canopy trees in the area (Remis, 2000). Our long-term data indicate that the accuracy of line-transect censuses and resulting gorilla densities in this and other studies are influenced by within- and between-site variation in gorilla nest construction patterns (Remis, 1993). Initially, in 1997 gorillas did not appear to be primary targets of hunters within the study sectors, though they were reported to be targets in more remote areas inside and beyond the Reserve borders. Indeed, our average numbers of gorilla nests per kilometre for the RDS Reserve were markedly similar to those recorded by Carroll in a 1985 survey (1.8 gorilla nests per kilometre, Carroll, 1986).

Thus, the 1997 census data provide a snapshot of potential ability of gorillas to subsist, at least temporarily, in a multiple-use zone, alongside light levels of logging, which temporarily increases the availability of herbaceous foraging material. Perhaps gorillas are especially likely to co-exist with humans where research and tourism efforts focus awareness on, and increase the value of, this species (see Weber and Vedder, 2001; Sicotte and Uwengale, 2002). Nevertheless, the subsequent 2002 and 2005 census data show that gorillas' presence and mean nest group size in most sectors appear dramatically reduced relative to the earlier surveys. The abundance of gorilla nests per kilometre of transect fell in all sectors (Core Park Sites: pre-1992 = 2.5, 2005 = 0.7; Remote Reserve Sectors: pre-1992 = 1.6, 2005 = 0.2; Remote Ndoki Park Sector: pre-1992 = 3.1, 2005 = 1.4). Further, in the mid-1980s, gorilla nest size averaged more than four adult-sized nests but had fallen to just over one in the Remote Reserve Sectors in 2005 (Carroll, 1986, 1988; Fay, 1989; Fay and Agnana, 1991; Remis *et al.*, 2006; Remis and Hardin, in prep.).

The recent data show that human activity has increased in the remote sectors, and is no longer concentrated close to villages. Reduced game densities apparently require hunters to travel longer distances in search of more productive forest zones. BaAka hunters in 2002 and 2005 noted that they were hunting within the Park borders because of higher animal abundance in these less exploited zones. The Park sites we surveyed revealed different patterns of human use. The Kongana Park Sector was regularly patrolled by Park guards in 2002. Nevertheless, heavy hunting pressure by commercial Bilo hunters at other sites (at the Messapoula headwaters Park site, and in the southern remote Ndoki Park sector) were apparently already impacting animal densities there (especially the main prey of duikers), despite protection status and relative inaccessibility of these sectors. The Ndoki site appeared to be, once again, a commercial centre for meat and ivory hunting, much of which is likely exported through Cameroon (TRAFFIC, 2005). These cross-sector insights about key species, as they are interacting with a range of human uses of the area, also prompt us to reflect on several management issues or approaches.

Integrated conservation and development projects

There is often a divide between the conservation community with a natural science ecosystem perspective and social science researchers championing human and property rights. Current conservation debates point to the need for an alternative to the guards with guns approach to preservationist conservation efforts . . . at the same time, the integrated conservation and development approach (ICDP) has faltered without providing adequate levels of success on either conservation or development fronts (see research reviewed in Hughes and Flintan, 2001; Salafsky and Margoluis, 2004). The ICDP model's baseline assumptions about links between development and conservation objectives remain unproved, largely due to imperfect monitoring and evaluation efforts (Barrett and Arcese, 1995).³ Current conservation policy emphasizes the continued need to jointly consider human needs and conservation, but to come up with new methods for more successful implementation and realistic expectations (Wells and McShane, 2004). Although some projects have added ecological or sociological monitoring to the lists of things that they do (Kreman *et al.*, 1994), at RDS there seems to be little analysis of those data or direct flow of information between assessments and decisions about practice.

Conservationists (within RDS and beyond) throw up their arms about how difficult it is to run an effective ICDP conservation project in Bayanga because of the nature of the complex socio-economic-political context. Indeed, political instability and remoteness of the Reserve have made it difficult to increase ecotourism revenues (Blom, 2000). Further challenges include a large proportion of immigrants in the growing population, unrealistic expectations about compensations and benefits that should be dispersed to stakeholders and interest groups, general unwillingness to comply with forest regulations, and ease of

access to forest resources (loggers, trucks, and a grid of logging roads maintained by both logging and conservation).

The ICDP model has been criticized as ineffective for conservation, and as embodying an incompatibility between development and conservation goals (Oates, 1999). Proponents of the approach, however, note that it has never been evaluated on a more long-term basis. Rather, due to the political economy of project funding, much debate is centred around superficial reviews of ICDPs across contexts or with fairly shallow time-depth. At the same time, the politics of more stringently protected protected areas, with their resultant displacement of human populations, are growing more and more volatile despite their long histories (Anderson and Grove, 1987; Schmidt-Soltau, 2003). If it is possible to render the ICDP model more effective, then the very terms on which ICDPs are formulated as 'projects' must, we argue, be adjusted to reflect their status as complex, intercultural, and cross-species experiments. The lens of anthropology with its combined biological and cultural approaches provides a unique standpoint from which to launch this effort.

Our results show clearly that the integration of conservation activities into the Bayanga area has caused different distributions of constraint and opportunity among even the subset of Reserve residents known as BaAka. While new sources of logging or conservation revenue provide new options for some residents, many have mixed feelings about the fact that the national park area is currently off limits for all activities save research, tourism, and education, although hunting is permitted in other sectors. Because of its reliance on distinct zones, the ICDP approach has weakened the BaAka community from Messapoula in terms of their capacity to spend time in the forest in ways described for residents of the Mabongo sector. And yet, that relative cultural and economic impoverishment does seem to coincide with greater faunal diversity, and the cultivation of expertise about that fauna, among a select few in the Messapoula community. We shall further consider the problem of zones below.

Zoning: distinctions between buffer and core; Reserve and Park

One central irony did emerge from our reflection and analysis. Tourism or research in a place such as Bai Hokou could not be carried out had a logging company not created the road that leads there from town. Given the legacy of roads from logging, intensive tourism and research could be the only alternatives to the Buffer Zone scenario of apparently increasing pressure and wildlife scarcity, even in the fairly distant camps where pedestrian traffic for forest use is limited.

Research camps in the core Dzanga Park sector are unique examples of the ways in which new activities affect power relations and human-animal interaction. As distant from town as other Core Park Sites, but more integrally protected, the harvesting of plants and animals at Bai Hokou is minimal, but not non-existent. In fact, illegal activity appears to be on the rise in the Park sector as Reserve residents recognize its high game densities, as punitive measures taken against Park encroachers weaken, and as human population density in the surrounding area increases due to upswings in economic activity.

The comparison of the different sectors at RDS provides insights into the difficulty of safeguarding both cultural and biological biodiversity in this area, and calls for reconsideration of the literature on hunting and tropical forest conservation. Obviously, as our findings confirm, multiple-use buffer zones are locations for a vast array of human activity, both legal and illegal, whose intensity can increase in proximity to towns. But it is important to note the longer-term trajectory noted here whereby the radius of exploitation reaches beyond the buffer zone into the core. Research that seeks patterns for regional-level planning purposes, asserting proximity to roads and/or population pressure as the fundamental factors determining hunting pressure, may miss the mosaic and longitudinal effects we are describing here for both humans and animals – gorillas and elephants in particular

(Fitzgibbon *et al.*, 1995; also Laurance *et al.*, 2006). Consideration of various legal, political, infrastructural, and ecological factors at the micro-regional level might help explain significant differences between sectors within a single protected area, and should not be overlooked in analysis of change or attempts at management.

As is true for people, impacts, reactions, and outcomes of wildlife can vary widely within the protected area. Where hunting is most intense, small ungulates (duikers) are extremely scarce or absent and monkeys are present but cryptic. Hunting and other human activities impact elephant ranging patterns and abundance at RDS despite the protected status of elephants (Barnes *et al.*, 1991). Gorillas are likewise beginning to show declines at RDS, with group sizes and numbers of nests per kilometre now lower than before the inception of the protected area. In fact, by 2005, distance from town had broken down as a major factor explaining spatial patterning of wildlife at RDS, alongside a diversification of hunting locations but decrease in the variety of resource use and ritual practices by particular human communities. When more commercial hunting combines with intensive subsistence-level practices, the resultant pressure seems likely to render the long-term practice of either type of hunting unsustainable within Reserve sectors.

In these diverse efforts to make ends meet, all come up against newly created (if weakly enforced) borders between 'sectors' of the protected area, as well as against newly reinforced and patrolled national borders. This broader study demonstrates that if the census data had been analysed independently of (1) long-term data collection on climate, fruiting patterns, or gorilla socio-ecology in the region, and (2) cultural anthropological data on family histories, gender roles, and property relations, interpretations would have run the risk of being both inaccurate and overly simplistic (Hardin and Remis, 2006). We might, for instance, have failed to recognize the impacts of variations in microhabitat use by large mammals, or local variation in gorilla nesting patterns in interpreting gorilla census data. We might have simply considered BaAka forest foragers and Bilo farmers/hunters as 'indigenous people', rather than examining various sub-groups as they relate to market shifts, technological innovations, formal policies, and micro-regional ecological variations.

At the planning stages, such complex thresholds and adaptations were not considered. Rather, the reasons why the 'community hunting' area of the Reserve zone was located in the southern, rather than the northern part of the Park was dictated because of the location of valuable ecological resources for tourism at the Dzanga clearing. This has created one BaAka community more involved with logging and commercial hunting; the other with conservation and research. And now we begin to see mobility in more permanent ways across these communities.

In terms of reducing negative impacts of logging on wildlife, comparative fine-grained data provide some suggestions for more ecologically minded extraction practices. For example, chimpanzees fared better at Budongo, Uganda where logging occurred in small blocks than at Lope or RDS (Plumptre and Reynolds, 1994). Examination of fine-grained data on ape abundance in areas under different logging regimes suggest that careful planning of extraction could significantly reduce ecological damage caused by logging and other industries (also Tabarelli and Gascon, 2005).

Multidisciplinary impact studies, research-driven conservation policies for more sustainable use, and governmental monitoring of logging operations in protected areas, in combination, could all significantly further conservation of biodiversity in the Buffer Zones surrounding national parks including those at RDS. This sort of approach is captured by the turn toward adaptive management in much recent policy and practice.

Adaptive management

In the case of RDS, much of the necessary data already exist, but are often ignored or underutilized. As researchers and collaborators to our field-based colleagues, we have often

encountered frustrations about continued and repeated claims from project staff that scientific reports were never filed. Others complain that copies no longer exist in project archives or libraries when national or expatriate researchers come to look for results of previous studies. We have personally encountered resistance to the dissemination and sharing of our research results at RDS despite our extensive efforts to file reports, present results, and engage with local conservation managers at the completion of each of our projects. During our 2005 visit, project staff charged with the daily nuts and bolts of protected area management asked us to again present the 2002 results, and only at that time began to engage with these now outdated results, no longer as useful for modifying conservation practice, given the escalating and continued deterioration of wildlife abundance in the Reserve.

At stake is neither the compliance, nor the conscience, of either researchers or project personnel here. Rather, it is the value accorded to particular kinds of knowledge in the challenging arenas of project management (which, of course, is often closely linked to information management). In this case, the low value of information impeded its circulation, and made for a clumsy and ineffectual interface between researchers and managers. In other cases, it is the high value of information that can impede its circulation and render such interfaces ineffectual. ICDPs were created with very little role for research, either scientific or social-science oriented. Many managers subsequently realized the need to integrate particular scientific methods into their monitoring practices, towards solving problems of implementations and unrealistic expectations.

Internationally, anthropology is increasingly being used to accomplish big business agendas to alter products, and to fine tune marketing strategies in accordance with knowledge about consumers. In the conservation world, where access to financial resources has always been a challenge, the possibility that basic research might trumpet flaws in an imperfect, ambitious, and rapidly changing process must be weighed against the possibility

Box 5.1 Specific ways in which the role of anthropological research might better inform policy in the RDS

- Planning where to target anti-poaching patrols should be systematically informed by continuous assessment of animal abundance and human activities in different sectors of the Reserve. This would reduce the influences of social pressures on decisions about where to patrol.
- Sustainable use guidelines should be modified in conjunction with local demographic and socio-economic information on patterns of use as they change over time.
- Setting quotas for safari hunting offtake should be informed by existing data on animal behaviour, populations, and use to avoid over-exploitation.
- Adapting wildlife regulations and permitted uses should be informed by information about community hunting, marketing, and trade patterns over time and space.
- Adapting regulations for extractive industry should be done in close association with independent monitoring and research on local forestry practices.
- Setting guidelines for community access to forest resources or compensations for limitations to access should be based on ethnographic data describing patterns of use, levels of dependence, and local understandings that could be integrated into guidelines for developing feasible and culturally relevant alternatives to overuse.

that such insights might provide valuable information for the adjustment of policies and planning processes.

In the case of the RDS, a 'Comité de la Recherche Scientifique' was formed during the early 1990s, in order to enable project staff and active researchers to review and accept or reject incoming proposals for scientific research. This process was intended to address serious concerns on behalf of several broader communities: project staff who simply could not provide logistical support for an infinite number of researchers; residents of the Reserve who had experienced intrusive or culturally inappropriate research methods as objectionable; and, finally, researchers themselves, who might seek input from those familiar with the field setting. The committee, however, had fairly high turnover rates, and occasionally encountered conflicts of interest between researchers or professionals currently in place and those who proposed to come. There was little or no protocol for such issues to be addressed and, ultimately, the unwieldy process was unable to assert itself as a definitive mechanism for management and integration of research and conservation.

Capacity building

The practice of science as power is intricately bound up with the colonial and postcolonial histories of many protected areas, and cannot be ignored (Coquery-Vidrovitch, 1998). Certain inequitable relations of access are embedded in the very basic assumptions of formal research, as well as in the rules and codes that serve to govern many protected areas. Such structural inequalities must be considered in relation to capacity building and the politics of knowledge in the area. Conflicts between conservationists and local communities have been increasing in recent years (see Giles-Vernick, 1999). During our field research in the mid-1990s some mornings in the town of Bayanga saw groups of angry women marching to the front door of conservation offices with the crushed remnants of their corn or manioc plants, complaining about the nightly ravages of elephants in their fields. As we have discussed elsewhere, hunter/gatherers and women are two groups who are likely to suffer most from the alienation of forest resources for tourism and research.

And yet, in part due to the exigencies of field research, our experience in field camps with the cultural/health/social benefits of family participation in research camp life introduced us to a different kind of model for forest management and research than the male-dominated, military-style research camps common throughout the region (see Hardin and Remis, 2006). While a set of clearly articulated feminist reflections on conservation practice has not yet emerged (and is most urgently needed), we can safely note that the combination of cultural and biological anthropology offers remarkable possibilities for the identification of alternatives to dominant and increasingly standardized modes of monitoring, surveillance, and discipline within protected areas, enhancing some of the more socially progressive elements of conservation practice.

The anthropology of indigenous knowledge has, itself, become more reflective of the transnational and inter-group dynamics of knowledge construction in these complex and natural-resource rich sites (Agrawal, 1995). For conservationists to effectively recognize the contributions of local experts – both those who are formally trained and those who are not – remains a challenge. In some cases, recognizing those contributions can also craft changes in them. The project has been a force for social change, and its hiring practices reflect that. Perhaps as an expansion of their traditional roles as large-game hunters, a male-centred professionalism is emerging around conservation-related encounters with wildlife in this part of the core protected area at RDS. The BaAka research trackers impart information to novice expatriates, Bilo researchers, and younger BaAka during camp life, also expanding their own knowledge bases and skills. This contrasts markedly with their roles as porters and trackers for patrolling Bilo Park guards, about which many BaAka complain bitterly due to the lack of respect they are accorded in that context. Researchers, now, often hire BaAka

on a two-weeks-on and two-weeks-off schedule, in an effort to accommodate their other subsistence activities. In addition, the Reserve administration has recently hired its first two female guards.

Terrain Dimali, BaAka tracker who studied literacy and guide skills with Hardin's research team in 1992, 1995, and 1997, has become the first from his social group of hunters and gatherers to be a formally employed Reserve guide within the RDS. Sylvain Dangholo, a child of regional ethnic groups known for their wandering fishing practices, completed a Masters degree in Geography at the University of Bangui, collaborating with Hardin on her dissertation research, and is now employed in the Rural Development branch of the RDS, implementing policies where his Master's thesis critically engaged them. On a more ecological front, Bruno Bokoto DeSombeli, a former member of the Remis research team during his university student days, is now responsible for ecological monitoring at RDS. In all these ways, and more, we have seen anthropological training work hand in hand with more straightforward conservation monitoring and marketing practices, building local participants' abilities and experience in long-term qualitative and quantitative research, and thereby strengthening the capacity of local actors and institutions to respond to changing conditions by blending old and new skills and perspectives on the forests they inhabit.⁴

And yet there is a long way to travel with respect to these issues, and to the conflicts currently coming to a head around them. Conservation management practice results in alienation of people from their resource base with only mixed success at preserving that resource base. As a result, women turn to agriculture and other economic activities which pose new management challenges and have negative consequences for conservation. They extend their territory into areas where new economies promise profitable livelihoods but endanger the sustainability of the animal populations upon which they depend.

The anthropology of protected area management is just now experiencing its first flush of full-length monographs (see, for example, Walley, 2004; West, 2006). Other social science approaches that emerge from geography, history, or political science are in conversation with anthropology about the complexities of current alienation and reconfiguration in relationships of resource access in rural worlds (see, for example, Giles-Vernick, 2002; Agrawal, 2005; Moore, 2005). An informed anthropological approach to perceptions of alienation from resources recognizes human dependence on those animal populations being conserved and a need for a middle-ground approach. An environmental anthropological approach to conservation problems facing the RDS in the ICDP case study we describe leads us to: (1) consider the ecosystem consequences of human activities and how to better approach the interdependence of humans and animal populations in a protected area; and (2) integrate and enable women's participation in conservation-related employment and benefits.

Cross-cultural keystones

Garibaldi and Turner (2004a) introduce the concept of cultural keystones as those species whose removal alters the structure of a community, not only ecologically but economically, or in other ways. Not only are the subsistence foundations of many human groups directly tied to the continued availability and use of particular plant or animal species (Cristancho and Vining, 2004), but examining the linkages between the role of particular species in cultural and ecological systems emphasizes the interdependence of animal and human communities (Berkes and Folke, 1998; Dove, 2001; Berkes *et al.*, 2003; also Wolch and Emel, 1998). Power *et al.* (1996) advocate that recognition of cultural keystones might help strengthen social systems, leading to improved efforts to help maintain their ecological integrity.

We are also interested in the role that particular species play in the cultural politics and practices of identity, not only at the level of clan or tribe, but also at the level of projects,

corporations, and the curiosity of travellers or investors. We have seen our informants and collaborators manipulate and embrace such cross-culturally significant symbols of their forest homes, such as gorillas or elephants.

To our mind, then, keystones exemplify a management concept (Simberloff, 1998) currently in vogue that can be invigorated and improved through engagement with anthropology, making its use less evocative of the need for some people to be managed by others. Anthropology is uniquely positioned to infuse such considerations into the current and

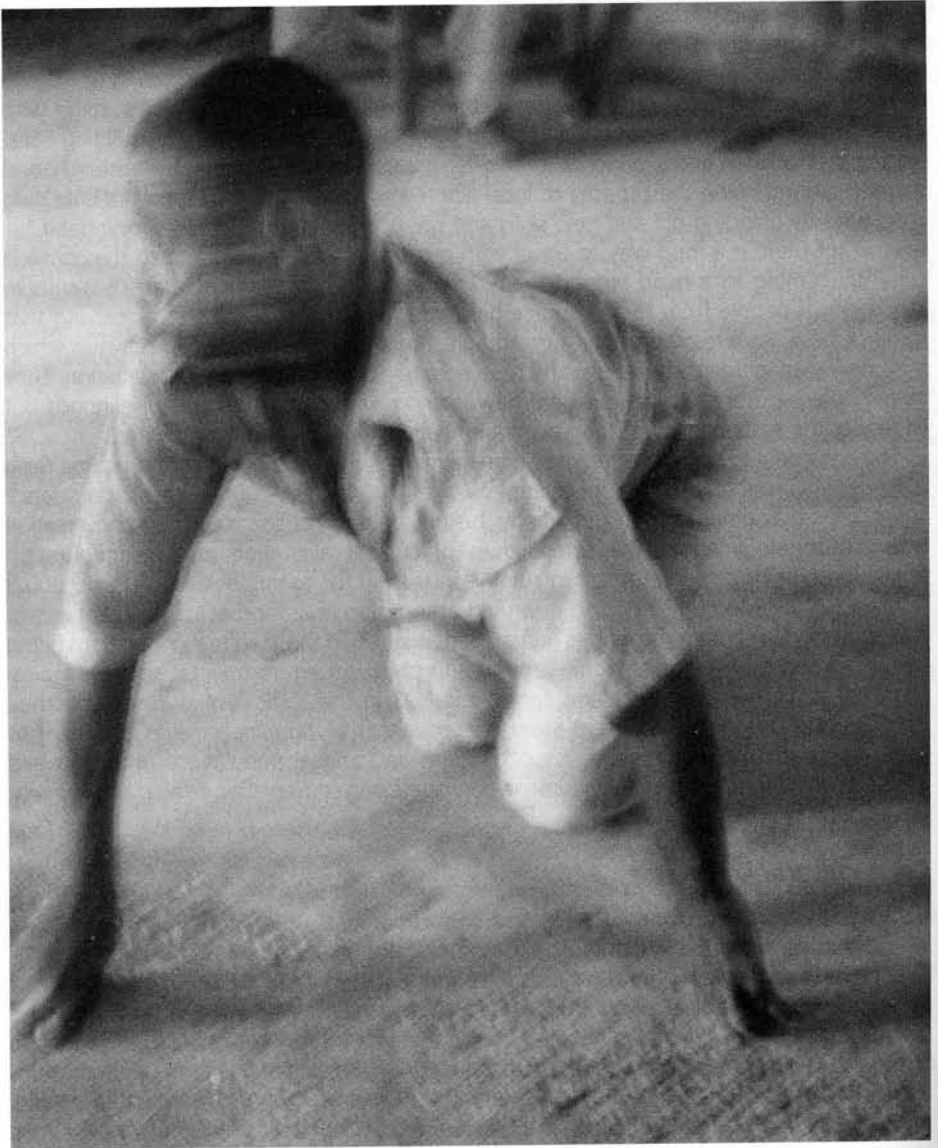


Figure 5.4 Photograph of tracker Moyekoli, who becomes a gorilla in dance and song. Not fully visible in this photo is Ellemo who has become a gorilla researcher, pretending to juggle stopwatch, binoculars, notebook, and removal of sweat bees from under her contact lenses (photo: Melissa Remis)

effervescent debates around issues of cultural keystones. Gorillas are prime candidates for consideration not only as ecological and cultural keystones *within* the context of the western Congo basin (Lewis, 2002) but beyond with the remaking of King Kong, a metaphor for cross-cultural contact, for human difference, fear of the other, and villager/pygmy divide (stories about gorillas abducting villagers and taking them back to the forest) (Haraway, 1989; Browne, 2006).

Gorillas are thus enormously important in the tourist imaginary about RDS (Hardin, 2000). At the same time, traditional BaAka stories, songs, and dance about gorillas and chimpanzees are important forms of transmission of forest lore and knowledge to younger generations. They continue to be central even as BaAka transform their perception of, and relationships to, these animals, and their folktales and coming-of-age stories focus on animal viewing rather than hunting experiences. But now as gorillas and other key wildlife decline at RDS, at forest research camps gorilla folktales are often replaced by heated disgruntled discussions of conservation policies and wildlife scarcity in communal hunting zones. In nearby Equatorial Guinea, those displaced from direct contact with gorillas in protected areas attributed their increased hunting of gorillas to their displacement outside the protected forest area, which reduced their concerns about nightly spiritual retribution by killed gorillas (Schmidt-Soltau, 2003).

We argue that investigating the possibilities of capitalizing on the cultural importance of gorillas holds great potential, for mobilizing it in ways that would be useful in the management of protected areas, and getting locals on board with conservation goals. Anthropology is uniquely qualified to analyse the human-primate relationship in light of both changing economic and ecological relationships and the complex cultural meanings of gorillas in colonial and postcolonial contexts.

Conclusion

The conditions under which conservation regimes confer tenuous and temporary protection to particularly prominent (or mediatized) animals raise an important set of methodological questions for further research on complex human/wildlife interactions. We have written this chapter within the framework of protected area management despite the fact that much recent attention, particularly to primate populations, suggests that protected areas may not be the solution to their survival (e.g. Walsh *et al.*, 2003).

Pressures on wildlife and other natural resources in the CAR have escalated in the past ten years during a period of particular economic and political instability, including lack of wages paid to civil servants. At odds with Western notions of the recreational and aesthetic values and uses of protected areas (Kellert, 1995), most community members interviewed at RDS have regarded allowing wildlife stocks to multiply to ensure future use as the primary incentive for creation and continued protection of RDS (Carroll, 1997; Remis field notes; also Sicotte and Uwengeli, 2002). For many, with few alternatives in the country as a whole, that day has arrived. The challenge of how to ensure more sustainable use and long-term preservation of these wildlife stocks remains unmet.

Rapid assessments can complement, but must not replace finer-grained monitoring over time. Our work speaks to the current debates about how to move conservation science forward to provide the foundations needed to simultaneously conserve biological and cultural diversity and implement conservation programmes that benefit traditional people (Sanderson and Redford, 2003; Robinson, 2006; Wilkie *et al.*, 2006).⁵ Our combined analyses highlight the complex ways resources are used over time, on micro-regional levels. Because what initially looks like species abundance could be seasonal or otherwise temporary, we need to have a long-term window into behavioural changes and impacts on the dynamics of animal populations. Our work points to the unique contribution of a reflexive understanding of the complexity of the animal/human dynamic. We emphasize the need to think beyond

management categories often projected onto the landscape, instead focusing on how particular areas are truly utilized by people and animals. Our work provides snapshots that look beyond either animals or humans as individual actors, and attempts to discern broader patterns that reflect ecological and social change, and reveal differences between stated attitudes or preferences, and practice.

Notes

- 1 For a more detailed historical presentation of logging and conservation-related activities in the region, see Hardin and Remis, 2006.
- 2 WWF is the World Wildlife Fund; GTZ is a German development agency, Gemeinschaft für technische Zusammenarbeit.
- 3 Some researchers have called attention to the ICDP's lack of incorporation of adequate scientific research and tendency to rely on 'rapid' appraisals (Newmark and Hough, 2000). Further, few ICDPs have attempted to link biodiversity with socio-economic monitoring during project implementation, preventing analysis of, for example, whether alternative income generation has resulted in more sustainable management of biodiversity resources (Hughes and Flintan, 2001).
- 4 See Hardin and Remis, 1997. Available at www.yale.edu/sangha on the 'conferences' page (last accessed 1 June 2006).
- 5 For further resources on these issues, see the Anthropology and Environment section of the AAA at www.eanth.org/onlineresources2.php; the Society for Applied Anthropology also has a page at www.sfaa.net/eap/abouteap.html; and the University of Georgia is building an excellent programme of study and research on these precise issues (see www.uga.edu/eea). All sites accessed 1 June 2006.

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