CHAPTER 5 Review of Existing Conservation Areas

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CHAPTER 5

Review of Existing Conservation Areas

Korup National Park entrance, Cameroon.

In this chapter we describe the designated protected areas in the Gulf of Guinea forests and discuss the extent to which they protect the region's biodiversity, especially its endemic and threatened animals and plants.

THE DISTRIBUTION OF PROTECTED AREAS AND OTHER RESERVES

Figures 17 and 18 map the distribution, in Nigeria and Cameroon respectively, of existing and proposed protected areas and reserves in the Gulf of Guinea forests. Figure 19 shows these areas in relation to vegetation.

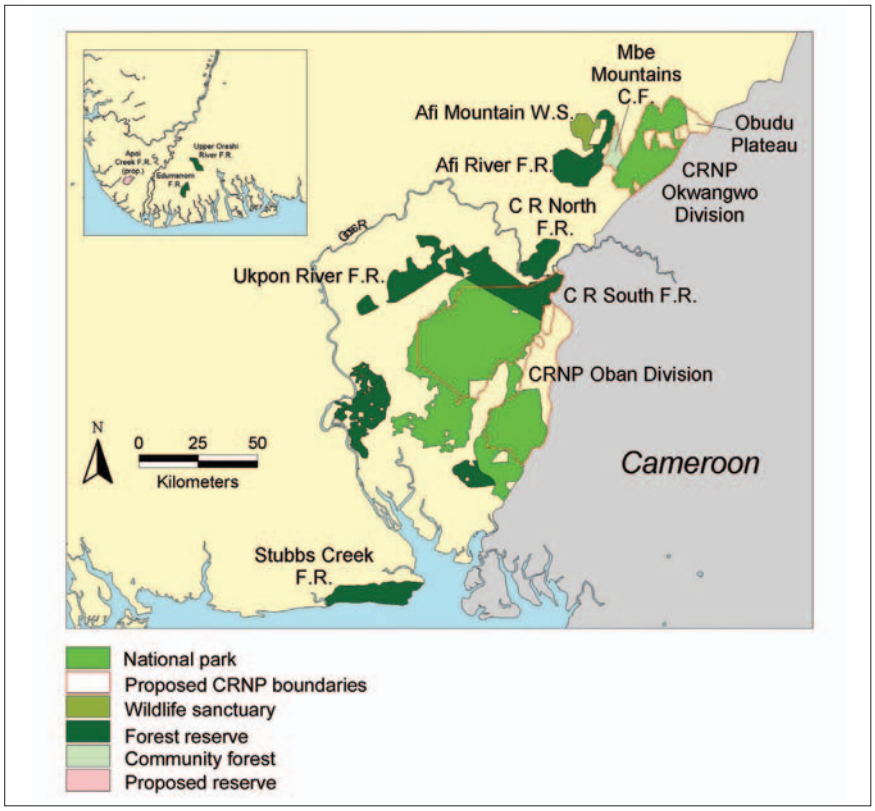

Figure 17. Existing and proposed protected areas and other reserves in southeastern Nigeria and the Niger Delta (inset). Both the current legal boundaries of Cross River National Park (as decreed in 1991) and the boundaries recommended by the park management plan (Caldecott *et al.* 1990) are shown.

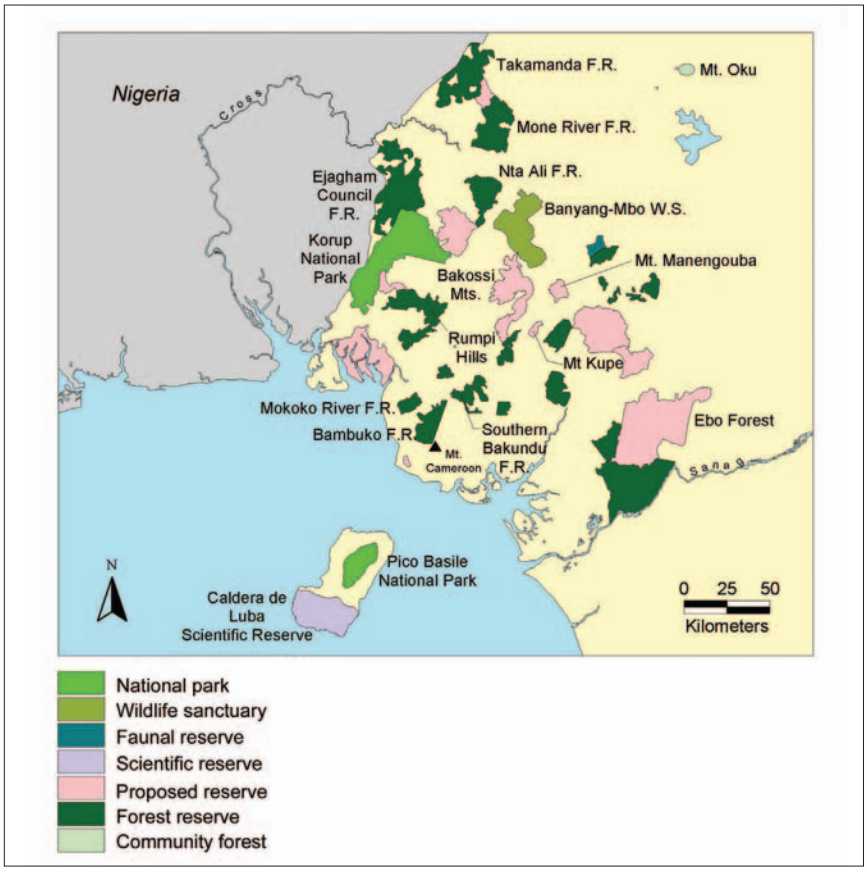

Figure 18. Existing and proposed protected areas and other reserves in southwestern Cameroon and Bioko (information on proposed reserves from a MINEF zoning plan supplied to WCS Cameroon).

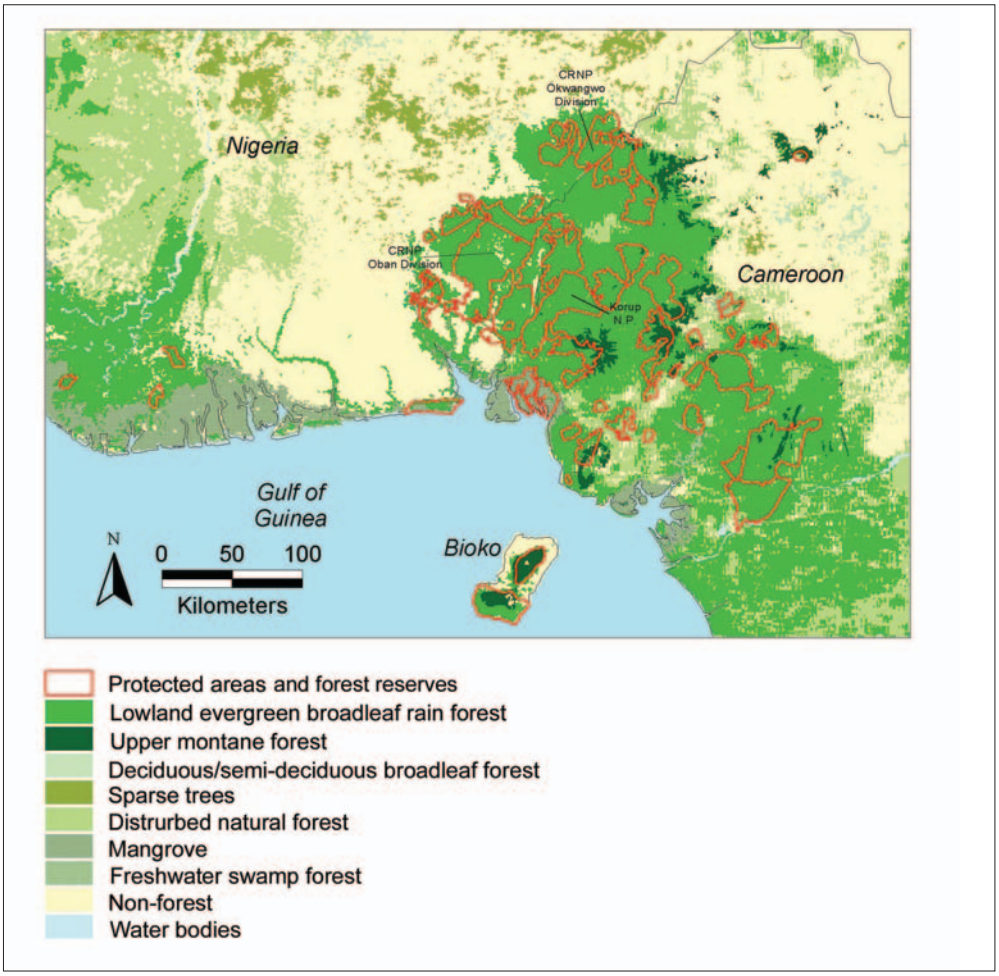

Figure 19. Protected areas and forest reserves in the study region in relation to land cover (for details of protected areas see Figs. 17 and 18; land cover data from WCMC, see Fig. 3).

Protected areas

Within the region, legally designated protected areas in which biological conservation is a priority presently include three national parks (Cross River in Nigeria, Korup in Cameroon, and Pico Basilé on Bioko), two wildlife sanctuaries (Afi Mountain in Nigeria and Banyang-Mbo in Cameroon), and one scientific reserve (Caldera de Luba on Bioko Island) (Table 8). Ngandjui and Blanc (2000) claim that three small areas in Cameroon—Kimbi, Mbi and Oku—have been designated as "faunal reserves" (Réserves de faune). However, R. Fotso (personal communication) informs us that these areas have no such designation, although Mt. Oku is currently a proposed community forest.

In November 2000, Cameroon's Ministry of the Environment and Forests (MINEF) introduced a "Plan de Zonage" that includes proposals for several new protected areas. Of the areas proposed for our study region, two are ecological reserves (Mount Kupé and the Etinde section of Mt. Cameroon or "small Mount Cameroon"), three are faunal reserves (Rio Del Rey, the area between the Takamanda and Mone River Forest Reserves, and an area east and south of Nkongsamba that includes Mt. Nlonako), and one is a large wildlife sanctuary (the Ebo Forest, south of Yingui between the Dibamba and Ouem Rivers) (Source: MINEF map provided to us by R. Fotso). In addition, under this plan the Bakossi Mountains, the Nkwende Hills, Mt. Manengouba, and a corridor between the Rumpi Hills and Korup National Park would be designated "Protected Forests."

Forest reserves

Forest reserves in Anglophone West Africa are areas designated by government for forest protection and management, typically to protect water supplies and provide a supply of timber and other forest products. They are supposed to be harvested according to plans drawn up by the responsible government management authority (a state Forestry Department or Commission in Nigeria, the Ministry of Environment and Forests in Cameroon), the agency that typically provides logging licenses to private contractors. These forest reserves provide no special protection to wildlife, and biodiversity conservation has not, traditionally, been one of their main aims. They are therefore not usually regarded as protected areas, although they appear to qualify for IUCN's designation as Multiple Use Management/ Managed Resource Areas.

In Nigeria, Cross River State contains 12 forest reserves. The former Oban Block forest reserve is now the Oban Division of Cross River National Park, while the Okwangwo, Boshi, and Boshi Extension reserves have become Cross River National Park's Okwangwo Division. The largest forest reserves remaining outside the Park are Afi River, Cross River South, and Ukpon

Table 8. Legally designated protected areas within the Gulf of Guinea forests region, excluding forest reserves.

Name	Country	Status	Area (km²)
Cross River	Nigeria	National Park	ca. 3,650
Korup	Cameroon	National Park	1,260
Pico Basilé	Equatorial Guinea	National Park	350
Banyang-Mbo	Cameroon	Wildlife Sanctuary	650
Afi Mountain	Nigeria	Wildlife Sanctuary	100
Caldera de Luba	Equatorial Guinea	Scientific Reserve	600
TOTAL area			**6,610**

River. Numerous small forest reserves and proposed forest reserves are also located in the other Nigerian states between the Niger and Cross Rivers, though many are now largely deforested. Those with the most potential importance for biodiversity conservation may be the Edumanon and Upper Orashi forest reserve in Bayelsa State (on the eastern edge of the Niger Delta), the proposed Apoi Creek forest reserve in Bayelsa State (in the central delta), and the Stubbs Creek forest reserve in Akwa Ibom State (on the western side of the Cross River mouth).

The Cameroon sector of the region also contains numerous forest reserves (see Figure 18). Among the most important are the Ejagham, Rumpi Hills, and Nta Ali forest reserves in the Korup project area; the Mokoko River and Southern Bakundu forest reserves in the foothills of Mount Cameroon; and the Takamanda and Mone River forest reserves north of Mamfe and the Cross River.

DESCRIPTION AND EVALUATION OF PARTICULAR AREAS

In this section we describe the legally designated protected areas in the Gulf of Guinea forests region, together with those forest reserves and proposed protected areas that have particular conservation significance from the perspective of our analysis. We also discuss some of the management challenges facing these areas.

Cross River National Park, Nigeria

Cross River National Park (CRNP) was established by presidential decree in 1991, following feasibility studies managed by the World Wide Fund for Nature-UK (WWF) and funded by the UK Overseas Development Administration (now DfID) and the European Commission, working in conjunction with the Cross River state government and the federal government of Nigeria. Previously, a long-standing government proposal for one or more national parks in the area had been hampered by a lack of resources. WWF stepped in at the encouragement of the Nigerian Conservation Foundation (NCF), who had carried out biological surveys in the area. WWF was also deeply involved in developing Cameroon's Korup National Park, which is adjacent to CRNP.

The two divisions of CRNP are the Oban Division (approximately 3,000 km², south of the Cross River), created from the former Oban Group forest reserve; and the Okwangwo Division (640 km², north of the Cross), created from the former Okwangwo, Boshi, and Boshi Extension forest reserves. The divisions are separated by 63 km. Some of this intervening area, which is partially forested, is included in other forest reserves. The forest of Oban is contiguous with that of Korup.

The area encompassed by CRNP was chosen because it has relatively intact forests (Oban is the largest remaining continuous area of closed-canopy rain forest in Nigeria), its biological richness is internationally recognized, it forms an important watershed, and it is highly threatened by farming, hunting, logging, and fire. At the same time, the area also has considerable potential for tourism (Caldecott *et al.* 1989, Caldecott *et al.* 1990).

Cross River National Park contains large areas of lowland rain forest (covering all of Oban Division and part of Okwangwo Division) as well as an unbroken elevational gradient of lowland to submontane forest in the Okwangwo Division. This gradient rises from 150 m above sea level in the valleys of Cross River tributaries to 1,700 m on the edge of the Obudu Plateau. Parts of the central Oban Hills rise above 500 m, with one peak reaching approximately 1,000 m. Although the Obudu Plateau itself has high rainfall, the Okwangwo Division in general has lower annual rainfall than Oban, with a longer dry season and therefore a different forest structure. Among the many biologically significant features of CRNP are its small population of Cross River gorillas (below the Obudu Plateau in the former Boshi Extension forest reserve, which was created as a gorilla sanctuary in 1958), and its population of Preuss's red colobus monkeys (in the Oban Division, northeast of Ekonganaku towards Korup).

Following the policy WWF pursued at Korup, a "support zone" was established around CRNP for the human communities located near the park, though support zone programs were later canceled due to funding shortfalls (see below). Communities within this zone were to be assisted with agricultural and economic development as compensation for lost access to park resources. They were also to be involved in park activities so that they might have a vested interest in defending it (Holland *et al.* 1989).

CRNP is managed by Nigeria National Parks, an agency of the federal government under the Ministry of the Environment. Park headquarters are located in Akamkpa, about 10 km from the southwestern edge of the Oban Division, with a divisional office at Butatong, 4 km west of the Okwangwo Division boundary.

In 2000, CRNP had a staff of approximately 250 people, 100 of whom were employed directly in the park protection

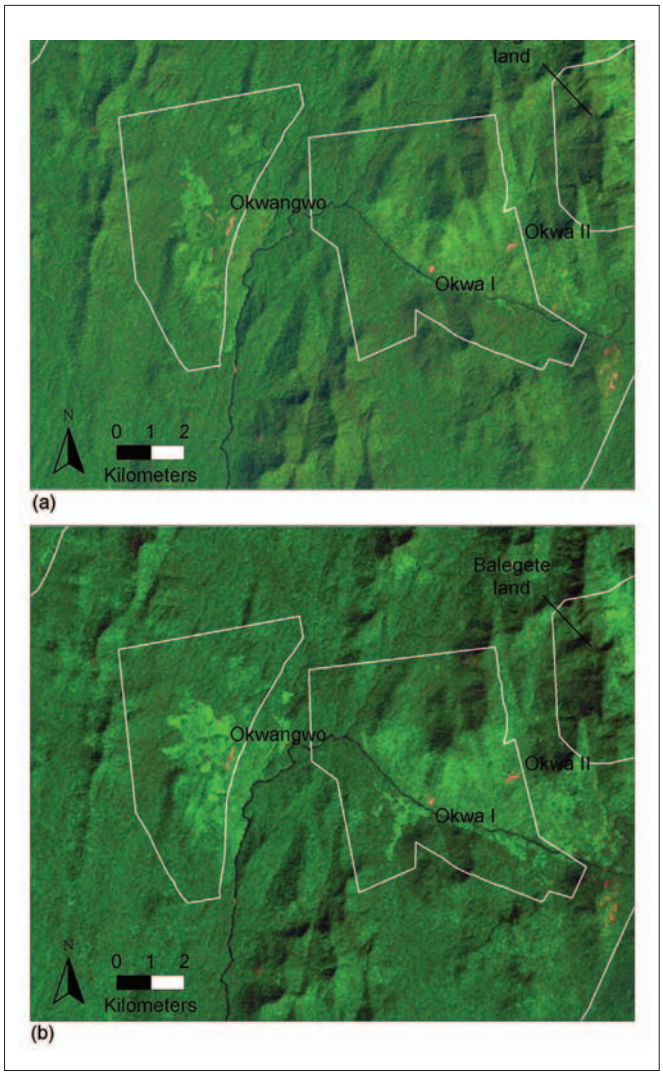

Figure 20. Landsat satellite images from 1986 (a) and 2000 (b) showing increase in the extent and intensity of forest loss around three villages enclaved within Cross River National Park. Undisturbed forest appears dark green, disturbed forest/farm land appears light green, and human settlement/bare earth appears pink.

force as guards and rangers (two thirds at Oban, one third at Okwangwo). A bonus system for park staff (for instance, rewarding staff who arrest poachers who are prosecuted) is not in place, though management would like to institute such a system if funds become available.

Since CRNP was established, the threat of commercial logging in the Oban and Okwangwo forests has diminished significantly. When the park was first mapped, existing logging concessions in the Oban Division were revoked in exchange for concessions in other state reserves. Some illegal logging has occurred in CRNP since its creation, but most of this has been on a small scale. A greater threat to the park's integrity is hunting, which is mostly driven by the commercial bushmeat market. Despite the efforts of park authorities, high levels of hunting still occur in most sectors of the park and have particularly impacted anthropoid primates and other larger mammals, which are now at low densities almost everywhere. Oates and Bergl encountered no monkeys during three days in the Boshi Extension area of Okwangwo Division in 1999, Oates saw none during seven days in the Ekonganaku area of Oban in 2000 (though *Cercopithecus* calls were heard on four occasions), and Bergl saw no monkeys (but heard one set of calls) during three days near Ekonganaku in 2001.

In 1995 the effort to control hunting in the park became more difficult after the European Union (EU) withdrew support for a management program in Oban, ostensibly in response to the military government's execution of Ogoni activist Ken Saro-Wiwa. In addition, a WWF park advisory program at Okwangwo, also supported with EU funding, came to an end in 1998. This substantial loss of support has not only limited the funds available for hiring protection staff and for equipment purchases, it has brought an end to the support zone programs, leading to antagonism from local communities whose hopes of development assistance had been raised (Oates 1999).

Another unresolved problem in CRNP is the presence of village enclaves within the park's boundaries, notably Mkpot I and Ekonganaku in the Oban Division, and Okwangwo, Okwa I, and Okwa II in the Okwangwo Division. These villages existed before the formation of the original forest reserves, so reserve boundaries were drawn around them and they were left with their own farmland. Over time, village populations have grown, causing demands for more farmland and increased pressure on forest resources. Furthermore, now that the EU has withdrawn its support, progress has not been made on proposals to resettle Mkpot and the Okwangwo villages, creating an especially serious problem for the Okwangwo and Okwa villages. Figure 20 shows Landsat imagery for the Okwangwo villages from 1986 and 2000. During this period forest clearance increased quite dramatically within and beyond the Okwa and Okwangwo enclaves, so that by 2000 Okwa farmlands were beginning to merge with those of Balegete to the northeast and Cameroon to the east. As a result, only a tenuous forest connection now remains between the Boshi Extension forests in the north of the Okwangwo Division and the hill forest south of Okwa. Communities have responded to the lack of development assistance and resettlement opportunities by showing considerable hostility to park management and interfering with protection efforts in the Okwangwo Division.

Park management is also hindered by the government's failure to formally gazette the boundaries recommended by park planning consultants in 1989–90. The official decree from 1991 (Decree 36) established the park's boundaries as those of the original Oban and Boshi-Okwangwo forest reserves. But in Oban, consultants recommended boundaries that include a section of community forest linking the main Oban Hills forest to Korup through the area north of Ekonganaku, while excluding Ekonganaku itself in order to keep the community from becoming a park enclave. In Okwangwo, the recommended boundaries include the Mbe Mountains (home to one of the Cross River gorilla subpopulations) and the Obudu Plateau (see sections below). Although park managers often work on the basis of the recommended boundaries, these do not yet have the force of law. The actual and recommended boundaries are shown in Figure 17.

Apart from the limited research Oates has recently done on the primates of CRNP, in association with Nwufoh and Eniang

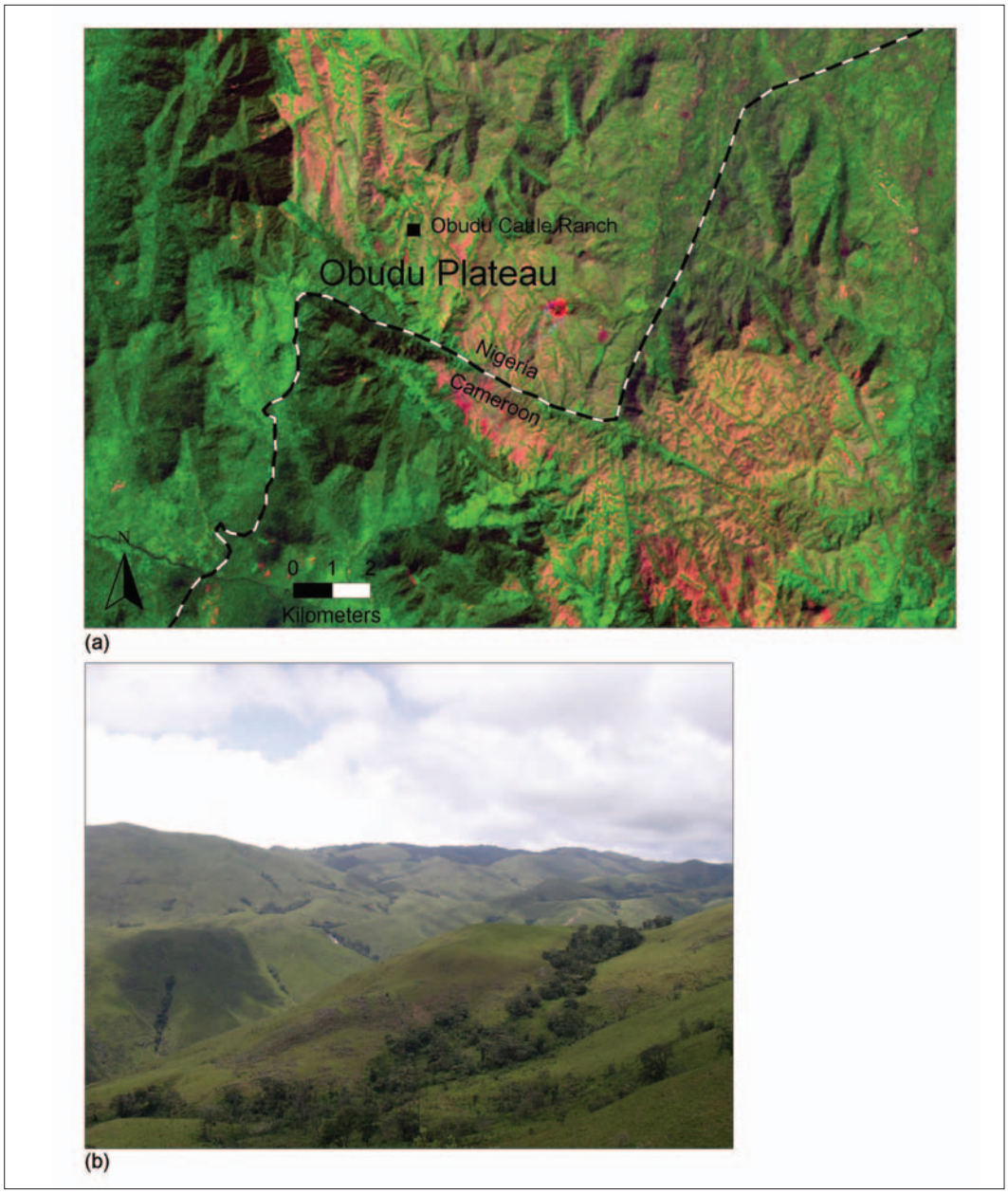

Figure 21. (a) Satellite image (Landsat 7; December 2000) of the highland area along the Nigerian-Cameroon border showing the dissected nature of the area. Pink areas are probably recently burned grassland and human settlements (for instance, the Balegete villages in the southwestern corner of this scene). (b) A view of the Obudu Plateau looking WNW from near the Obudu Cattle Ranch, September 2002.

of the NGO Biodiversity Preservation Group, the biology of the park remains quite poorly known. During the 1980s, J. Reid carried out one of the few biological studies of CRNP, an inventory project in the Oban section, especially near Calabar (Reid 1989). A WWF project from 1994 to 1996 continued Reid's inventory (Schmitt 1996). NCF and WWF also conducted a biological inventory in Okwangwo from 1995 to 1998 (Obot 2000).

Finally, some tourist infrastructure is being developed near Akamkpa in the Oban Division (motorable tracks and simple accommodations) and at Kanyang near the Okwangwo Division (a visitor's center), but at this point the level of tourism in the park is very low.

Obudu Plateau, Nigeria

The Obudu Plateau is a dissected upland area covering about 90 km^2 between elevations of 1,200 and 1,800 m adjacent to similar upland areas across the border in Cameroon. Most of the plateau is covered by annually-burned grassland, but patches of submontane and montane forest survive, particularly along some of the stream and river valleys. Until the 1950s the plateau was used only by Fulani cattle herders and, seasonally, by hunters from the lowlands. An influx of people began in 1951 when the government of what was then the Eastern Region of Nigeria established a cattle-ranching operation on the plateau. The influx increased after a hotel was opened on the ranch in 1959. By the 1980s the new residents were heavily exploiting the plateau

forests for firewood and were farming forest land because it had the best soil. By 1990 the state-managed ranch was in serious decline, and the approximately 1,400 people living on the plateau were surviving by subsistence farming; most of the plateau forest had been disturbed, and many sites near the ranch had been completely deforested (Oates *et al.* 1990; Figure 21).

Our analysis demonstrated the special biological importance of the plateau. In particular, the region is abundant in montane endemic birds, amphibians, and butterflies. Indeed, the region's biological importance has long been recognized. After a 1962 survey, George Petrides recommended national park status for the plateau (Petrides 1965), a recommendation that was repeated by J.B. Hall in 1981 (Hall 1981). The WWF-CRNP Okwangwo Division planning exercise in 1990 stressed the need for immediate action to halt the destruction of the plateau ecosystem, and proposed that the plateau be annexed to CRNP as a protected landscape and recuperation zone (Caldecott *et al.* 1990). However, as mentioned above, CRNP is officially designated only to include the former Boshi-Okwangwo forest reserves, so the plateau has yet to be annexed.

Although the Obudu Plateau as a whole still has no special conservation status, it has received some conservation attention since the inception of Cross River National Park. A park ranger post has been established at the ranch, and the WWF-CRNP Okwangwo Programme collaborated with the local Becheve community and the NCF to establish a nature reserve protecting the forest near the ranch hotel that provides the hotel's water supply (the 25 ha Becheve Nature Reserve). In addition, the NGO Development in Nigeria has based itself at the ranch and is engaged in efforts both to prevent dry-season fire damage to plateau forests and encourage the ranch village communities to adopt new vegetable farming techniques (including potato farming) to take pressure off the plateau forests. These measures appear to have slowed the destruction of the forest and, in some places, to have reversed it.

The results of a five-hour observation session near the ranch hotel in April 2001 by Roger Fotso of WCS-Cameroon indicate that the Obudu Plateau still retains some of its biologically special features. Fotso observed nine species of restricted-range birds (including Bannerman's weaver, *Ploceus bannermani*), as well as a group of Preuss's guenons (*Cercopithecus preussi*). Moreover, studies by Daniel Louk (Hunter College Dept. of Anthropology) in early 2002 show that at least three groups of Preuss's guenons continue to use the plateau forests.

The cool climate and fine scenery of the plateau, combined with its interesting fauna and flora, give it considerable tourism potential. Until recently the Obudu Cattle Ranch hotel on the plateau received modest numbers of visitors, especially from within Nigeria. However, recognizing the area's potential as a tourist destination, the Cross River state government launched an ambitious renovation of the ranch hotel in 2000, including construction of a new conference center and golf course. In late 2002 the hotel was officially reopened under the management of a South African-based company. Nevertheless, environmental groups have raised some concerns about the ecological impacts of the construction work that accompanied the renovation and the expansion of the hotel's facilities. These concerns have grown since 2002 with the announcement of plans to build a presidential lodge near the hotel and to install a cable-car system from the lowlands to the plateau. In addition, the original cattle ranching system is being revived.

Mbe Mountains, Nigeria

The Mbe Mountains lie in an area of community land sandwiched between the Okwangwo Division of CRNP and the Afi River Forest Reserve. In 1990 unfarmed forested land in the mountains was estimated to cover 100 km^2, mostly on hilly terrain on elevations up to around 900 m. Conservation groups became interested in the mountains after gorillas were discovered there in 1983 (Ebin 1983). Several teams sponsored by the NCF subsequently surveyed the mountains and made recommendations for a community-based conservation program (e.g., Harcourt *et al.* 1989). Such a program began in 1988, sponsored by the NCF and based near the villages of Kanyang at the western foot of the hills. Local hunters were hired as a protection force, local people were encouraged to limit their hunting, and efforts were made to establish a small-scale ecotourism program.

As discussed above, park planning consultants have recommended that CRNP be expanded to include the Mbe Mountains as a conservation and tourism zone (Caldecott *et al.* 1990), but, as with the Obudu Plateau, this annexation has yet to occur. However, the park authorities have developed the NCF Kanyang field station and added ranger accommodation and other facilities. Until recently, about ten rangers were assigned to Kanyang and were tasked with patrolling Mbe in cooperation with the landlord communities. In addition, local communities report that they are patrolling and managing Mbe on their own, although the extent and effectiveness of their efforts are unclear.

The mountains are surrounded on three sides by 10 villages that lay claim to parts of the forest, and in some cases these claims are competing. These communities have resisted inclusion of their land in the park and appear to be holding out for significant compensation.

Visitors to the Mbe Mountains usually see more wildlife than in other nearby forests. The gorilla population has been estimated at about 30 individuals, and drills and chimpanzees are also present. The mountains are also a nesting site for bare-headed rock fowl (*Picathartes oreas*). As for research, the Kanyang facilities could be a significant aid, but at present the local communities are somewhat resistant to research that they do not perceive as bringing direct benefits to them. However, the local NGO Biodiversity Preservation Group has managed to gain some local respect and, with support from the Wildlife Conservation Society and the Margot Marsh Biodiversity Foundation, has been able to continue low-level monitoring of the gorillas.

Afi Mountain Wildlife Sanctuary and Afi River Forest Reserve, Nigeria

Afi River Forest Reserve covers approximately 380 km^2 at the headwaters of the Afi River in the northern part of Cross River state, to the west of the Okwangwo Division of CRNP. The forest reserve includes part of one of the state's largest re-

maining blocks of forest outside CRNP. The northwestern corner of the forest reserve was gazetted as a wildlife sanctuary in 2000. The sanctuary and the forest reserve are managed by the Cross River State Forestry Commission. The approximately 100 km^2 sanctuary contains a mountainous area—Afi Mountain—that rises to elevations of around 1,300 m and is home to a subpopulation of Cross River gorillas, estimated at 25–30. Other endangered species at Afi are drills, chimpanzees, and *Picathartes*. On the western flank of the mountain, at Ebbaken-Boje, is a large grassland roost site for migratory European barn swallows; it has been suggested that this is the largest wintering roost site of barn swallows in Africa, occupied at times by 20 million birds.

Afi Mountain is relatively accessible by road, and is scenic, containing spectacular bare rock faces and pinnacles. Considerable logging has occurred under concessions in low-lying eastern and southern sections of the forest reserve, but the ruggedness of the mountain has protected the gorilla habitat from logging, although it is often damaged by dry-season fires that are started in nearby farmlands.

In a 1987 survey on behalf of NCF, John Ash discovered the swallow roost and the presence of *Picathartes* at Afi, and received reports of the existence of gorillas. Harcourt *et al.* (1989) subsequently surveyed gorilla populations in Nigeria (December 1987–January 1988) and recommended that core areas of gorilla habitat (including Afi Mountain) be gazetted as sanctuaries. The feasibility study for the Okwangwo Division of CRNP (Caldecott *et al.* 1990) contains the same recommendation for Afi Mountain, based on the need to stop hunting and protect the forest against fire. These reports also recommend that opportunities for gorilla-based tourism be explored.

In 1992, the NGO Pandrillus and the Cross River State Forestry Department (now Forestry Commission) began work on plans for the sanctuary. They have since developed an upcountry captive drill and chimpanzee rehabilitation facility on community land to the south of Buanchor, at the foot of the mountain. In 1993, Kelley McFarland of CUNY conducted a pilot study of the mountain's gorillas, and in 1996 began a long-term study, supported in part by WCS. WCS has continued to monitor these gorillas using the field assistants trained by McFarland. This monitoring builds on an earlier community-based patrol system sponsored by Pandrillus, and complements Pandrillus's community awareness program.

Fauna and Flora International (FFI) began supporting conservation efforts at Afi Mountain in 1999, and in April 2001 they joined with the Forestry Commission, Pandrillus, WCS, and NCF in a partnership to further conservation and research in the sanctuary.

In 2002 the government of Cross River State released funds to the Forestry Commission for the recruitment of a small protection force for Afi Mountain Wildlife Sanctuary. FFI has funded the appointment of a conservation coordinator for the sanctuary, and one of the coordinator's first tasks will be the training of the new sanctuary rangers, some of whom have been recruited from the gorilla research team. In addition to hunting, other management problems to be addressed are farming (mostly in low-lying areas near the edge of the sanctuary) and dry-season fires.

The feasibility of protecting a corridor of forest connecting Afi Mountain to the Mbe Mountains through the eastern part of the Afi River Forest Reserve is being studied. The Ikom-Obudu highway could be a serious impediment to animal movement, however, especially as there are plans to improve the road.

FOREST RESERVES BETWEEN THE NIGER AND CROSS RIVERS, NIGERIA

In the rain forest zone between the Niger and Cross Rivers, most of the forest reserves on dry land sites have been converted to farmland or plantations. However, large areas of swamp forest still survive in the Niger Delta itself (see Figure 3, p. 21), and further sections of such forest exist near the coast between the delta and mouth of the Cross River. Hardly any of these forests are pristine. Human settlements are scattered throughout the delta, especially on high ground near the banks of the Niger distributaries and the creek network; oil industry installations and operations are widespread; and individual artisans have harvested trees across the delta and in the other coastal forests. Although the tree harvest is conducted on a small scale, the cumulative effect has been serious. The logs are collected into large rafts that are delivered as far away as Lagos to be sold or processed; the cumulative result is that large trees (especially the most commercially valuable species) have been lost over much of the delta. In addition, animals are hunted everywhere for food, and a trade in meat has emerged with the rise of the oil industry.

In the Niger Delta, the status of forest reserves has been ambiguous. Many that appear on maps are apparently reserves that were proposed long ago but in many cases were never fully gazetted. The Delta was once largely confined to Rivers State, but it is now divided between Rivers and Bayelsa States. The forestry departments of both states have inadequate resources (Powell 1997).

Given our time limitations, we have focused our study on the immediate Nigeria-Cameroon border area, and have not devoted as much attention as we would have liked to the Niger Delta and the Niger-Cross area. However, we will briefly consider the three forest reserves of Edumanon (Bayelsa State), Upper Orashi (Bayelsa), and Stubbs Creek (Akwa Ibom) because of their importance for primate conservation. Another important area is near the town of Gbanraun in the Niger Delta, on the edge of the proposed Apoi Creek Forest Reserve (also Bayelsa State).

Edumanon Forest Reserve (approximately 90 km^2) was surveyed by C. Bocian in 1998–99, and was found to have patches of forest (thinned by tree felling) surrounded by cultivation and fallow bush. Chimpanzees were observed in the forests, with a total population estimated at not more than 50 individuals (C. Bocian, personal communication).

The Upper Orashi Forest Reserve (approximately 90 km^2) falls within a zone designated by Powell as the delta's "Eastern Flank" (1997). This zone contains populations of mammals typical of more eastern forests, such as the duiker *Cephalophus ogilbyi* and the squirrels *Paraxerus poensis* and *Funisciurus pyrrhopus talboti*; it also contains Sclater's guenon, *Cercopithecus sclateri.*

The zoological surveys by Powell led him to conclude that the ranges of *C. sclateri* and *C. erythrogaster* may overlap in the Upper Orashi Forest Reserve, with some hybridization occurring between the two species (C.B. Powell, personal communication). Powell (1997) was also informed by a reliable hunter that pygmy hippopotamuses survived in Upper Orashi at least until 1990.

Stubbs Creek Forest Reserve (311 km^2) occupies a series of parallel depressions and ridges (probably old beach lines) between the mouths of the Kwa Ibo and Cross Rivers. Explorations by E. Gadsby and P. Jenkins in 1989 found that a good deal of forest survived in the reserve and that four species of monkey were still present: *Cercocebus torquatus*, *Cercopithecus mona*, *C. nictitans*, and *C. sclateri* (Gadsby 1989). Although much of the reserve has been converted to farmland or plantation, as of 1990 an estimated 80 km^2 of relatively undisturbed swamp forest survived in the center of the reserve. Proposals have been developed for a wildlife sanctuary, but these have not yet come to fruition.

The wildlife of Edumanon, Upper Orashi, and Stubbs Creek Forest Reserves currently receives no special protection.

From 1996 to 1998, Lodewijk Werre of CUNY studied the ecology of Niger Delta red colobus monkeys (*Procolobus pennantii epieni*) in an area of marsh forest between the Pennington and Apoi Creeks and about 5 km southwest of the town of Gbanraun (4°48'N, 5°54'E), in the central Niger Delta. This area, on the edge of the proposed Apoi Creek Forest Reserve, has a relatively undisturbed forest habitat (although there has been a low level of tree cutting) and the highest density of red colobus monkeys found by Werre in a survey of the delta (Werre 2000). No hunting took place at the site during Werre's study. Other monkeys present are *Cercocebus torquatus*, *Cercopithecus mona*, and *C. nictitans*. Werre has recommended expanding his 1.5 km^2 study area into a 5–6 km^2 nature reserve and field station, managed by the University of Science and Technology, Port Harcourt, and supported by the Nigerian Agip Oil Company, in whose concession area the forest is located. The local community has expressed interest in this plan and would participate in managing the reserve.

Korup National Park and Korup Project Area, Cameroon

Korup National Park, created in 1986 from the former Korup Forest Reserve and some adjacent areas of forest, was intended to protect 1,260 km^2 of relatively undisturbed and high-diversity lowland rain forest, including a population of Preuss's red colobus monkey (*Procolobus pennantii preussi*), known from few other places. As with Cross River National Park, the plan for Korup was developed for the Government of Cameroon by WWF-UK with support from the UK Overseas Development Administration (now DfID), GTZ (the German technical assistance agency), and the European Commission.

The planning for Korup served as a model for the later development of Cross River National Park (CRNP). As with CRNP, a buffer or "support" zone was created adjacent to Korup, within which villages were to be given development assistance. This 5,360 km^2 support zone lies to the north, east, and south of the park and includes three major forest reserves (Ejagham, Nta Ali, and Rumpi Hills). To the west of the park lies the Oban Division of CRNP. The park and its support zone comprise the Korup Project Area (KPA). The Cameroon Ministry of Environment and Forests (MINEF) is responsible for managing the park and the forest reserves, and development activities and research in the KPA were until recently supported by WWF-Cameroon, the EU, and GTZ, with five percent of the protected area's funding coming from the Government of Cameroon and 95 percent from outside donors. However, the support zone component of the Korup project apparently came to an end in mid-2003 (A. Dunn & M. Waltert, personal communications), and WWF-Cameroon's support has been reduced.

Park headquarters is located 12 km from the park's southeastern boundary at Mundemba, with a sub-headquarters at Nguti, 45 km east of the northern part of the park. The Mundemba headquarters has many useful facilities, including a library and herbarium. At the time of Oates's visit in late 2000 the park had a total staff of about 65, including 14 game guards, 3 resettlement officers, several technical staff, and 40 administrators who worked both for the park and the support zone. The support zone project also employed 19 technical staff. Four patrols were posted on the park boundary, but the protection staff lacked adequate equipment for communication and long-range patrols. Support zone staff (paid with EU money) received higher salaries than park staff, although game guards were eligible for bonuses for overnight stays in the park and the seizure of guns and traps. Since Oates's visit at least one extra patrol post was established, new protection staff were added, and the rate at which patrols confiscated hunting materials increased (A. Dunn, personal communication). However, protection appears to have diminished since the beginning of 2004 as external support for the park has been reduced.

Similar to what occurred in CRNP, the immediate threat of commercial logging in Korup dissipated when it was declared a national park, although the threat may have already been low because the area previously had no road access and a low apparent density of commercially-valuable tree species. However, hunting is still a serious threat within the park. In addition, as in CRNP, enclaved villages within Korup pose a problem. When the park was established, management plans called for the resettlement of the six villages that existed in the park. But by late 2000, only one of the six villages (Ikondo-Kondo, with about 200 people) had been resettled, to a location east of the park. The Ikondo-Kondo resettlement site near Mundemba (visited by Oates) has well-built housing, a piped water supply, a community hall, and primary school. The cost of resettlement (funded by the EU and the US Dept. of Defense) was CFA 360,000,000 (almost $500,000 in 2000). It is not clear how the other resettlements will be funded, and Ikondo-Kondo people still return to their original village site to harvest crops. However, work has begun on resettling the small village of Bareka II. The largest village enclaved in the park is Erat (or Ekon II), with over 400 people, located in the southwestern corner of the park, close to the Nigerian border. Cross-border trade from Erat to Ekonganaku in Nigeria is flourishing, much of it in smuggled goods. Park authorities allow Erat people (and many Nigerian traders) to use a major path through the south of the park, where the visitor and research infrastructure is located.

WCS had a biological research program in northern Korup (the Ikenge research station) from 1989 through 1993, when research shifted to Banyang-Mbo. Permanent tree plots have been established under a Smithsonian program in two locations in the park, and these are monitored at intervals. Recently, a park biologist began conducting regular large-mammal transect surveys in the southeast section of the park, near Mundemba. This area, which has been developed for tourism, has easily-traversed and well-marked trails, bridges over streams, and camp sites with well-constructed wooden buildings, proper latrines, and accessible bathing sites. A map is provided to visitors, who pay set fees to enter the park and to hire guides and porters. However, visitation is currently at low levels.

When Oates visited the southeastern part of Korup in November 2000, signs of mammals were relatively common and included tracks and feeding signs of elephants. We had at least 16 encounters with monkeys, all of which (where identification was possible) were identified as *Cercopithecus* spp., commonly in mixed-species associations. Twice, foraging signs of drills were observed. Preuss's red colobus monkey was not seen or heard, suggesting that the population of this monkey may have been affected by hunting. However, very little direct evidence of hunting was found in the area surveyed. Bergl and Linder, in their visit in October 2001, encountered many monkey associations in seven days of surveying park trails in this same general area, and encountered Preuss's red colobus twice (with one clear sighting).

Biological monitoring teams, organized under the auspices of the GTZ support-zone program, have conducted censuses of primates and drills in the northern part of the support zone, including Nta Ali Forest Reserve (Waltert *et al.* 2002). In the course of walking 596 km of transects in the northern support zone forest in 1999–2001, these census teams reported 188 visual encounters with primates (0.315 encounters/km). Waltert *et al.* estimated that they encountered 712 different groups of monkeys and apes, many of which were in multi-species associations; they encountered only two groups of drills, and three of red colobus. Noting an apparent major decline in numbers of the latter two species since 1990, probably due to hunting, Waltert *et al.* call for more effective conservation management of the support zone, integrated with management of the national park and of the neighboring Oban area; they suggest that this management should be combined with an environmental education program.

The Ejagham Council Forest Reserve is a potentially key area, lying between the northwestern part of Korup and the community forest area in the northeast of the Oban Division of CRNP in Nigeria (proposed for inclusion in CRNP, but not yet annexed). Ejagham remains little studied. The Rumpi Hills Forest Reserve southeast of Korup has land rising to 1,768 m (Mount Rata) and therefore supports areas of montane forest and some of the endemic montane species of our region; it also remains relatively little explored biologically, and the forest is apparently not highly disturbed.

Banyang-Mbo Wildlife Sanctuary, Cameroon

In 1994, WCS moved its research effort in southwest Cameroon from the Ikenge area of Korup to the Banyang-Mbo Council Forest Reserve. Working with local communities and the government of Cameroon, WCS helped create the Banyang-Mbo Wildlife Sanctuary (662 km^2), which was gazetted in March 1996 and covers much of the original council forest, together with extensive hill areas to the southeast. The hills, which rise to over 1,700 m and lie close to the northeastern part of the Bakossi Mountains, support some montane forest. The endangered Mount Kupé bush-shrike (*Telophorus kupeenesis*) has recently been found to occur in the montane forest of Banyang-Mbo and Bakossi, as well as at Mount Kupé.

With significant support from a Dutch government (DGIS) grant, the WCS project has focused on establishing a community-based sustainable-use management program for the sanctuary. The plan is for the 54 villages located within 10 km of the sanctuary boundary to undertake management under the authorization of MINEF, on terms negotiated with the communities. Management agreements are to be drawn up between villages, MINEF, and the project, under which the communities will be asked to manage their portion of the forest wisely. As part of this management plan, the government will authorize villagers to patrol the forest.

From 1999, WCS staff have been engaged in a biological inventory of the sanctuary, socioeconomic studies of the communities, and conservation education and awareness-raising projects. WCS has also overseen the construction of a research station near the forest, within a short distance of the town of Nguti (7 km from the sanctuary), where WCS has its office and staff accommodation at this station. Biological surveys have been conducted on the basis of a stratified random sample of 50 points throughout the forest. These points were plotted using GPS. No regularly-monitored fixed transects have been established. When visiting Banyang-Mbo in November 2000, Oates was told that few monkeys have been seen on surveys, which is consistent with observations made by Oates at Banyang-Mbo in 1997, as well as subsequent reports obtained from Katherine Gonder and Lee White. However, the WCS sampling technique (in which several people are active in a small area for a short period) is unlikely to readily detect monkeys that are already shy as a result of hunting.

Under present sanctuary management, villagers can hunt many animal species anywhere in the wildlife sanctuary, although certain threatened species (leopard—which may be extinct—elephant, buffalo, giant pangolin, drill, chimpanzee, water chevrotain, and tortoises) are supposed to be off limits. However, this protection system is monitored by hunters themselves; we were told that if any of the protected animals are killed for local consumption the event will probably not be reported. Some MINEF staff are present at Banyang-Mbo, but are said to do little patrolling. Local youth have taken action against hunters from communities outside the project area, evicting them from the forest. Non-timber forest products are freely harvested, some of which (such as bush mangos and eru leaf) are traded to Nigerians, but the creation of the sanctuary appears to have spared the forest from the commercial logging to which parts of it might otherwise have been exposed.

Takamanda Forest Reserve, Cameroon

Takamanda Forest Reserve (676 km^2) is located in the northwestern corner of South-West Province, adjacent to the Ni-

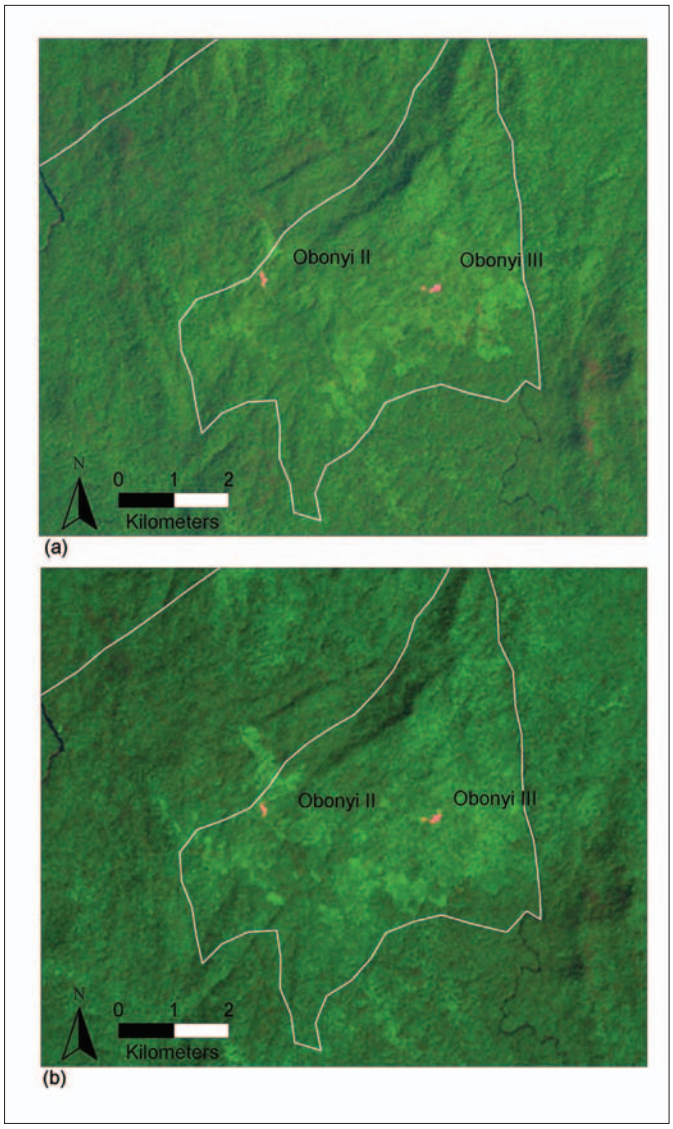

Figure 22. Landsat satellite images from 1986 (a) and 2000 (b) showing increase in the extent and intensity of forest loss around two villages enclaved within Takamanda Forest Reserve. Undisturbed forest appears dark green, disturbed forest/farm land appears light green, and human settlement/bare earth appears pink. White lines are reserve/enclave boundaries.

gerian border, across which lies the Okwangwo Division of Cross River National Park. This is one of the most inaccessible forests in Cameroon, with no motorable road yet running close to the forest. The type specimens of *Gorilla gorilla diehli* were collected in 1904 from the vicinity of the present forest reserve. During surveys in 1996–98, Jacqueline Groves confirmed the continued existence of gorillas in Takamanda.

Elevations in Takamanda rise from about 100 m in the south to over 1,600 m in the north, where the reserve adjoins the Obudu Plateau. As in Okwangwo, the reserve has a vegetational gradient that runs from lowland rain forest through lower montane forest to upper montane forest mixed with grassland.

Although Takamanda Forest Reserve officially comes under the jurisdiction of MINEF, the ministry had no staff based at the reserve at the time of our visit. In 2000, GTZ began its "Project for the protection of forests around Akwaya" (PROFA), in collaboration with MINEF; two of the project's focal areas are Takamanda and Mone River Forest Reserves. The project is headquartered in Mamfe, and, working in collaboration with MINEF, GTZ sends consultants and staff members to the field on surveys. The first three years of the GTZ project were an orientation phase devoted to gathering information and planning for a subsequent implementation phase (Ayeni & Mdaihli 2001).

Groves began a more intensive census of gorillas and other large mammals in Takamanda in September 2000, working in conjunction with GTZ and a Smithsonian Institution/Man and the Biosphere (SI/MAB) program entitled "Biodiversity Assessment and Monitoring of Takamanda and Okwangwo" (overseen by T. Sunderland). Groves's field surveys and interviews have revealed evidence of Cross River gorilla subpopulations in several parts of Takamanda, all restricted to hill areas. However, this research has also shown that possibilities still exist for migration between most of the gorilla subpopulations.

Under the SI/MAB program, whose initial phase is now complete, individual experts conducted inventories of the forest's fauna and flora. Sunderland led a survey that revealed the forest's vegetation to be very diverse. Among trees, caesalpinioid legumes were found to be relatively rare, but otherwise tree-species richness was very high, higher than in Korup or Ejagham to the south (Sunderland *et al.* 2002).

Oates joined Groves and Sunderland on a visit to Takamanda in October-November 2000 and found that, despite being remote from roads, the area has much evidence of human presence. Takamanda supports many stands of large trees, especially on hill ridges, and, although almost no commercial logging has taken place in the reserve, much of the forest is of secondary nature, probably due to generations of shifting cultivation. In addition, farmland is spread widely around the villages within the forest, and many demarcated enclave boundaries are apparently being neglected. Figure 22 shows Landsat images of the Obonyi village enclave within Takamanda in 1986 and 2000; there has been a significant increase in forest clearance in these few years, and an expansion of clearance north of the Obonyi II village beyond the reserve boundary.

Populations of larger mammals are now low in Takamanda. In 2000, Oates encountered monkeys only twice, and these (*Cercopithecus erythrotis* and *C. nictitans*) may have been part of one association. A specialist elephant hunter reported that elephants are now rare, and that the few encountered are entering Takamanda from Nigeria. The hunters have relatively strict hunting territories, and we were informed that Nigerians are not hunting in the Cameroonian part of the forest. Given the absence of MINEF field staff, hunters killing endangered species are not prosecuted.

The GTZ project has recommended that local communities participate in the future management of Takamanda. In a draft management proposal presented to a Cross River gorilla conservation workshop in Limbe, Cameroon, in August 2003 (J. Ayeni, personal communication), the project also recommended zoning Takamanda for multiple use, with a core "protected zone" established to protect gorilla populations and other key species, along with a "timber production zone" and a "future timber production zone." This proposal conflicts with MINEF's 2000

"Plan de Zonage" for protected areas and forest reserves, which suggested upgrading the protection status for all of Takamanda, a suggestion endorsed by the Limbe gorilla workshop. Discussions in Cameroon in early 2004 seem to have produced a consensus in favor of an upgraded protection status for Takamanda that could be linked to Okwangwo in Nigeria as a transboundary protected area, or "Peace Park" (T.C.H. Sunderland, personal communication).

Mone River Forest Reserve, Cameroon

Mone (or Mawne) River Forest Reserve covers 538 km^2 just north of the Manyu River (a major branch of the upper Cross), northeast of the town of Mamfe. The reserve appears to be mostly lowland forest on hilly terrain between 100 and 1,000 m elevation. The hilliest area is in the east. The reserve is poorly known biologically even though its southwest corner is only 10 km from Mamfe. In January 2001, J. Groves found gorilla nests in the reserve, in hills about 8 km east of the village of Mbu.

Mount Cameroon, Cameroon

Rising to 4,095 m, Mount Cameroon (or Fako) is the highest mountain and only active volcano in West Africa. Lowland forest at the mountain's base (much of it now lost to cultivation and plantations) changes to lower montane forest at around 800 m. The transition to upper montane forest occurs at around 1,800 m, with grassland beginning at about 2,200 m.

Despite the international significance of Mount Cameroon, none of it is strictly protected, although some have urged that it be designated a national park (e.g., Collar & Stuart 1988) and a World Heritage Site. The flanks and foothills of the mountain contain several forest reserves, including Bambuko, Mokoko River, and Southern Bakundu. Several new forest reserves have also been proposed, including Etinde, Mabeta-Moliwe, and Onge. Mokoko and Onge in the western foothills constitute the most intact and extensive lowland forest area, according to Cable and Cheek (1998), and contain plant species (e.g., of *Cola*) not found anywhere else.

A Mount Cameroon Project (MCP) began in 1994, funded by the UK ODA (now DfID). The project's stated aim is to involve local communities in biodiversity conservation. Although the management structure is difficult to comprehend, it appears to be divided into three units, each covering a different zone and/or set of management issues. One component is based in Limbe at the Botanic Garden and is funded by DfID; another component focusing on land use by northern communities is funded by GTZ and is based in Buea; the project also has a GEF-funded component. Various collaborative research programs are associated with MCP, including one funded by CARPE on utilization of non-timber forest products.

We have not had an opportunity to visit forests around Mount Cameroon or to study MCP activities first hand. However, information on file at the Limbe Botanic Garden Visitor Centre library (visited by Oates in November 2000) indicates that the main wildlife research and conservation component of MCP is in the Mokoko River Forest Reserve, where the project has helped establish the Mokoko Wildlife Management Association. This association apparently consists mostly of local hunters who have been trained in carrying out censuses of animal species and their habitats, and who are supposed to monitor their own exploitation of wildlife. Project reports show that the only evident constraints on hunting are laws against hunting with poison and with fence traps, together with the exclusion of hunters from outside villages. Plans have apparently been made to establish hunting quotas, but how the quotas would be enforced is unclear.

Mount Kupé and the Bakossi Mountains, Cameroon

Mount Kupé (2,084 m) lies to the northeast of Mount Cameroon and is granitic rather than volcanic. Kupé supports approximately 30 km^2 of forest, including an important area of montane forest with associated fauna (such as Preuss's guenon, *Cercopithecus preussi*, and the Mount Kupé bush-shrike, *Telophorus kupeenesis*). Mt. Kupé is not at this time formally protected, but has been proposed as an Ecological Reserve in MINEF's 2000 "Plan de Zonage."

Between 1991 and 1995, Birdlife International ran a project at Mount Kupé, financed by the EU, which focused on the conservation of montane forest birds, including the Mount Kupé bush-shrike, once believed to be restricted to Kupé but now reported at other sites including southern Banyang-Mbo. Starting in 1996, the Mount Kupé project was managed by WWF with funding from WWF-UK, DfID, and GEF. The project has suffered from management problems, and when we visited Kupé in November 2000 we were informed that funding was due to run out in mid-2001. At that time the project was aiming to register Mount Kupé as a "community forest" and help 16 local villages establish their own management system for it. A boundary was being demarcated at 1,000 m, above which farming would not be allowed, although some farms still existed above that altitude. We were told that, while local chiefs had issued a hunting ban for certain large animals, they were still being hunted.

Mount Kupé receives a modest level of ecotourism. A guide who led us on a mountain climb reported that he escorts tourist groups about 20 times each year. He noted that he has not seen drills or chimpanzees in the previous two years, nor had he seen bare-headed rock-fowls in the last 6 years. In 2000 the mountain had no regular patrol system, and the local MINEF office was said to be short-staffed.

The WWF project manager at Mount Kupé informed us that a proposal had been prepared to extend project activities into the nearby Bakossi Mountains, an area suggested for Protected Forest status in MINEF's Plan de Zonage. These rugged and poorly-known mountains rise to elevations of more than 1,700 m and are therefore an important area for montane species. Drills and Preuss's guenons are reported to occur there (King 1994). Work suggested in the proposal to extend the WWF Mount Kupé project includes a study of bushmeat offtake (some records are already being collected), transect censuses of primates, and village-based wildlife monitoring. Recently, the Center for the Reproduction of Endangered Species of the Zoological Society of San Diego launched a research and conservation program in the Bakossi Mountains, with a focus on the endangered drill.

Mount Manengouba, Cameroon

Mount Manengouba is an extinct volcano rising to 2,411 m with a caldera 4 km in diameter that contains two crater lakes. It is a key biological site, home to many regional endemics, some known at only one or a few other sites, and some known nowhere else (e.g., the amphibians *Cardioglossa trifasciata* and *Phrynobatrachus manengoubensis*). According to Collar and Stuart (1988) the montane forest of Manengouba is dry and stunted in character (possibly because it is in the rain shadow of Mt. Kupé) and patchy and disturbed from farming, tree-cutting, burning, and grazing.

Mount Manengouba currently has no formal protection, but in the new MINEF zoning plan for the region it is proposed as a Protected Forest.

Mount Oku, Cameroon

At 3,011 m, Mount Oku is the third highest mountain in West Africa (after Mount Cameroon and Pico Basilé on Bioko). Located in the northern part of the Bamenda Highlands, in the North-West Province of Cameroon, Mount Oku was produced by a combination of uplift and volcanism (Collar & Stuart 1988). On its western flank is Lake Oku, a crater lake. Mount Oku lies within the Kilum-Ijim forest area, which covers some 200 km^2. Human population density is very high in this part of Cameroon, and all lowland forest on the flanks of Mount Oku has been cleared for agriculture and grazing. The remaining forest between 2,000 and 3,000 m (about 100 km^2) is said to be the largest remaining area of upper montane forest in West Africa (Maisels *et al.* 2000). However, we estimate that more upper montane forest (though with a different species-composition) occurs on Bioko. The upper elevations of Mount Oku have sub-Afroalpine grassland otherwise found in this region only on Mount Cameroon and Bioko.

Mount Oku and its surroundings are extremely important as a site for endemic plants and animals. For instance, it is home to seven endemic small mammal species (one of which is an endemic genus), several endemic plant species, Bamenda Highland endemic birds (such as Bannerman's turaco, *Tauraco bannermani*), and several rare amphibians (Collar & Stuart 1988, Maisels *et al.* 2000, 2001, Verheyen *et al.* 1997). Preuss's guenons are also present.

BirdLife International (with MINEF) has had a conservation project (the Kilum-Ijim Forest project) at Mount Oku since 1987. The project has taken a community-based management approach, and has been funded by GEF, DfID, and the Dutch Ministry of Agriculture. The forest is still under great pressure, however. Because of deforestation and many years of hunting, the largest mammals (e.g., elephant, buffalo, leopard) have been extirpated while other large mammals have been reduced to small numbers (Maisels *et al.* 2001).

According to Ngandjui and Blanc (2000), Mount Oku is designated as a *Réserve de faune*, along with two small nearby sites, Kimbi and Mbi, but R. Fotso (personal communication) informs us that this information is erroneous.

Pico Basilé and Caldera de Luba, Bioko

The volcanic mass of Pico Basilé (at 3,011 m the second highest mountain in West Africa) dominates the landscape of northern Bioko. During Spanish colonial times, when the peak was called Santa Isabel and the island Fernando Poo, most of the lowland rain forest around the mountain was converted to cacao and coffee plantations, but natural vegetation survived on the peak's upper slopes. As on neighboring Mount Cameroon, lower montane forest begins at about 800 m. A transition to upper montane, cloud, or "moss" forest occurs at 1,500 m (although some accounts say 1,800 m), with another transition to montane heathland at 2,500 m, which gives way to grassland at the summit (Juste & Fa 1994, Pérez del Val 1996). Pico Basilé above 2,000 m is the only known habitat of the endemic Bioko white-eye (*Speirops brunneus*). The other regionally endemic bird species and subspecies generally occur both in the forests of Pico Basilé and in the forests of Bioko's southern highlands (Pérez del Val *et al.* 1994).

According to Castroviejo *et al.* (1994), a Pico de Santa Isabel park was decreed by the colonial government of Spanish Equatorial Guinea in the 1960s, but does not appear to have become effective before independence in 1968. No conservation progress occurred during the oppressive regime of Macias Nguema, which lasted until 1979. Under the auspices of the Spanish technical cooperation agency, a Research and Nature Conservation Programme was launched in Equatorial Guinea in 1985, managed by the Asociación Amigos del Coto de Doñana research and conservation program. This program recommended a network of protected areas, which led to the declaration of nine protected zones in 1988, two of them on Bioko: Pico Basilé and Sur de Bioko. The Amigos del Coto de Doñana program has not been active on Bioko since 1998, but the role it played in stimulating research and conservation has been taken over by the Bioko Biodiversity Protection Program (BBPP) of Beaver College, Pennsylvania (now renamed Arcadia University), directed by Gail Hearn.

For many years after the two Bioko protected zones were declared, no practical measures were taken to conserve them. But in May 2000, probably in part because of growing international concern about conservation on Bioko, Pico Basilé was officially declared a national park, and the southern highlands declared a scientific reserve (known as the Caldera de Luba reserve). In July-September 2002, 81 km of the protected areas' boundaries in critical access zones were said to have been demarcated and park signboards posted (report from Conservation International, November 2002).

As originally proposed, the Pico Basilé park covered 350 km^2 of the upper slopes of the mountain, above the 800 m contour. The upper parts of the Pico contain very few human settlements, but a meteorological station is located on the summit, accessible by a guarded road. The guard post only controls unauthorized access by vehicles, however, and largely uncontrolled hunting has occurred on the mountain until very recently, with many hunters traveling the road on foot to reach a network of hunting trails. Hearn and Morra (2000) claim that over-hunting caused a decline in the number of primate carcasses from the Pico area entering the Malabo market in 1997–2000. Money entering the Equatorial Guinea and Bioko economy from the newly-de-

veloped offshore oil industry is probably increasing consumer demand for bushmeat.

The Luba protected area on Bioko covers approximately 600 km^2 of the southern portion of the island, including the Gran Caldera de Luba (the impressive remains of a large volcano, whose walls reach to 2,261 m), the crater lake of Biao (2,009 m), and areas of lowland "monsoon" forest on the very wet southern coast of the island. This area is largely uninhabited, with the exception of the small town of Ureca near the center of the southern coast, and pressures on it have therefore not been as great as on Pico Basilé.

In recent years the southern highlands are the only part of Bioko where researchers have confirmed the presence of all the island's monkeys, including Pennant's red colobus, the drill, and Preuss's guenon (Butynski & Koster 1994). Similarly, several of the island's birds, including *Ceratogymna atrata* and *Picathartes oreas*, have recently been recorded only in the southern highlands (Pérez del Val 1996). The beaches of the southern coast of Bioko are also an important nesting site for four species of marine turtle, including the leatherback *Dermochelys coriacea* (Butynski & Koster 1989).

Hearn of the BBPP began surveys of the primates and other mammals in the Gran Caldera de Luba in 1997. These surveys, which take place during several weeks of the dry season each year, have relied particularly on the help of students from American colleges, but they have also come to involve students and faculty from Equatorial Guinea's National University. The BBPP has established two camps in the Gran Caldera, as well as a network of trails extending from these camps, along which censuses of mammals are conducted. This project has also now expanded to include surveys of turtle nesting on the southern beaches, a project originally run by the Doñana group.

The Caldera forest has an unusual appearance, showing signs of frequent major disturbance, probably from wet-season storms. Especially in the northern part of the Caldera, dense undergrowth (reaching to around 5 m) covers large areas, and through this undergrowth emerge scattered trees. The Caldera forest at around 1,000 m is similar in appearance to mainland forests at around 1,500 m. Rain and clouds are frequent even in dry season months.

Oates visited the Caldera in January 2001 with a BBPP team and observed *Mandrillus leucophaeus, Cercopithecus pogonias, C. erythrotis, C. preussi, Procolobus pennantii*, and *Colobus satanas,* and heard *Cercopithecus nictitans*. Although monkeys were much less shy of people in the Caldera forest than in adjacent mainland forests, almost all Caldera monkeys showed clear flight reactions to people. Hearn informed us that there was hunting in the Caldera between 1990 and 1996, but since then hunting appears to have declined. BBPP-employed assistants from Ureca currently visit the Caldera at monthly intervals, creating an informal protection system that Hearn speculates has limited the number of hunters entering the Caldera each year to three or four.

The combined factors of the BBPP program and the inaccessibility of the Gran Caldera de Luba (it can be reached only by hiking up the valley of the Rio Ole from the southern coast) have made this the best protected site on Bioko, but hunting is probably increasing in other parts of the southern highlands, particularly near Moka. In a visit to other areas of the southern highlands in January 2002, a BBPP team (including Oates) observed large numbers of *C. erythrotis* and moderate numbers of *C. pogonias* as well as several groups of *M. leucophaeus*. Hunters were also encountered, as well as traps and the casings of shotgun cartridges. No evidence of red colobus was found.

BBPP envisages a management system for the Caldera de Luba reserve that would give a significant role to the widely respected national university rather than the government's forestry division, whose main focus is the logging of mainland forests.

CONCLUSIONS FROM PROTECTED AREA REVIEW

Our review of the protected areas of the Gulf of Guinea forests yields several clear observations:

First, legally protected areas cover only a small portion of the study region, despite its tremendous biological importance. Only 6,610 km^2 (6.1%) of the region's 109,000 km^2 are included within legally protected areas (excluding forest reserves). However, existing and proposed protected areas do cover a relatively large proportion of the remaining forest in the Nigeria-Cameroon border region (Figure 19, p. 67).

Second, even inside the legally protected areas, conservation is rarely fully effective. The few parks and sanctuaries that have been established do a relatively good job of habitat protection, but hunting of the larger animals (such as anthropoid primates and ungulates) is usually a serious problem.

Third, lack of adequate protection is, in part, a consequence of a lack of resources. The protected areas receive inadequate support from national or state governments. Instead, they have tended to depend heavily on foreign funding, but this funding has been unreliable and never guaranteed in the long term. Foreign funding has gone much more heavily into conservation-and-development projects than into basic protection mechanisms.

Fourth, in Cameroon, almost all the conservation projects we visited were working on, or towards, a community-based management model, with the sole exception of Korup National Park itself. We have not seen convincing evidence that such community conservation will effectively protect habitat or wildlife in the long run, especially in the absence of major foreign funding, outside technical assistance, and independent evaluations.

Fifth, the only areas where larger mammals, and especially primates, currently have some measure of protection from hunting (or did until recently) are sites which combine a constant (or frequent) research presence with relative inaccessibility. In Nigeria, such sites include Afi Mountain, Gbanraun in the Niger Delta, and the Mbe Mountains; in Cameroon, the southern part of Korup National Park; and on Bioko, the Gran Caldera de Luba.

Sixth, several important areas which currently have little or no legal protection, but which are important sites for endemic taxa, are threatened by serious habitat destruction and conversion (particular examples are small isolated montane areas such as Obudu Plateau and Mount Manengouba).

Finally, the status of several existing protected areas is ambiguous. For instance, the boundaries recommended for Cross River National Park in management studies are different from the legally decreed boundaries, and many potential protected areas in Cameroon are presently only "paper parks."

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