FAUNAL SURVEYS OF SELECTED MONTANE AND LOWLAND AREAS OF CAMEROON

Date: 10 April 1996

Submitted to: Dr. Steve Gartlan
WWF-Yaoundé
Cameroon

Submitted by: Brenda Larison[1], Thomas B. Smith[1], Duncan McNiven[2], Roger Fotso[3], Michael Bruford[4], Kimberly Holbrook[1], and Aaron Lamperti[1]

[1]Department of Biology
San Francisco State University
San Francisco, CA 94132 USA

[2]Royal Society for the Protection of Birds
The Lodge, Sandy, Bedfordshire UK

[3]ECOFAC
BP 13844
Yaoundé, Cameroon

[4]Institute of Zoology
Conservation Genetics
Regents Park, London, NWI 4RY, UK

ACKNOWLEDGMENTS

This project was greatly aided by the donations of various organizations. We thank Backpacker's Pantry, Sierra Designs, and Patagonia for their generous contributions.

TABLE OF CONTENTS

INTRODUCTION

Background

Endemism among montane birds and mammals is widespread in western Cameroon. The region includes some of the rarest and most threatened species in Africa (Louette 1981; Collar and Stuart 1985; Groombridge 1994). Since the early 1980's several of the major mountains in south-central Cameroon have been surveyed for vertebrates (Collar and Stuart 1985; Stuart 1986; Collar and Stuart 1988). Until the present survey was undertaken, however, few of the northern mountains in Cameroon had been examined. Additionally, there have been a number of faunal surveys in proposed or existing conservation areas in the forest zone of southeastern Cameroon (Stromayer and Ekobo 1991; Hall 1993). However, for the Nki region (Hall 1993) there had been no prior faunal surveys.

Objectives

To provide baseline information necessary for making informed conservation decisions we conducted faunal surveys of four montane and one forest site. Additionally, we gathered data to assess genetic distinctiveness of these regions, as well as at seven other sites across central and southern Cameroon, using target bird species as an index. The specific objective of surveys were to:

1) determine species richness and relative abundance of mammals (especially of primates) and birds,

2) evaluate current human impacts,

3) characterize the vegetation,

4) assess the genetic distinctiveness of each site for comparison with other regions in Cameroon using target bird species as an index,

5) based on information collected, make specific recommendations for conservation actions for each montane site, and Nki, east of Ngoila.

The emphasis of this report is on twelve sites surveyed in 1995, including five montane sites, six ecotone sites, and one lowland forest site east of Ngoïla. We report on species richness, relative abundance of mammals, human impacts and conservation potential for four montane sites: Mt. Ngang-Ha, Hoséré Vokré, Tchabal Gandaba, Tchabal Mbabo and one lowland site, east of Ngoïla. Additionally, we report on avian species richness and relative abundance for eleven sites, including limited data from Kilim (Mt. Oku), a fifth montane site. Results of preliminary genetic analyses are summarized in an accompanying report.

METHODS

STUDY SITES AND ITINERARY

Survey sites included five montane sites, one lowland forest site, and six savanna/forest ecotone sites which were visited between 5 May 1995 and 26 July 1995 (Table 1, Figure 1). Areas surveyed and transect locations for the four montane sites to be evaluated for conservation potential (Mt. Ngang-Ha, Hoséré Vokré, Tchabal Gandaba, Tchabal Mbabo) as well as for east of Ngoïla are shown in Figures 2 a-e.

Table 1. Locations and itinerary for 1995 study sites.

Site	Location	Elevation (m)	Survey Dates
Montane Forest Sites			
1. Mt. Ngang-Ha	07°N 14°20'E	1,923	25 May-3 June 1995
2. Hoséré Vokré	08°30'N 13°50'E	2,049	8-14 June 1995
3. Tchabal Gandaba	07°30'N 13°20'E	1,960	17-26 June 1995
4. Tchabal Mbabo	07°16'N 12°09'E	2,456	11-20 July 1995
5. Kilum (Mt. Oku),	06°15'N 10°26'E	3,011	21-26 July 1995
Lowland Forest Site			
6. East of Ngoïla	02°20'N, 14°30'E	500	28 May-6 June 1995
Ecotone Sites			
7. Bétaré Oya	05°36'N, 14°05'E	928	5-8 May 1995
8. Meiganga	06°31'N, 14°18'E	1,017	9-13 May 1995
9. Djohong	06°50'N, 14°40'E	1,320	14-17 May 1995
10. Ngaoundaba Ranch	07°08'N, 13°42'E	1,250	19-23 May 1995
11. Wakwa	07°14 N, 13°35'E	1,015	28 June-4 July 1995
12. Tibati	06°28'N, 12°38'E	1,200	5-10 July 1995

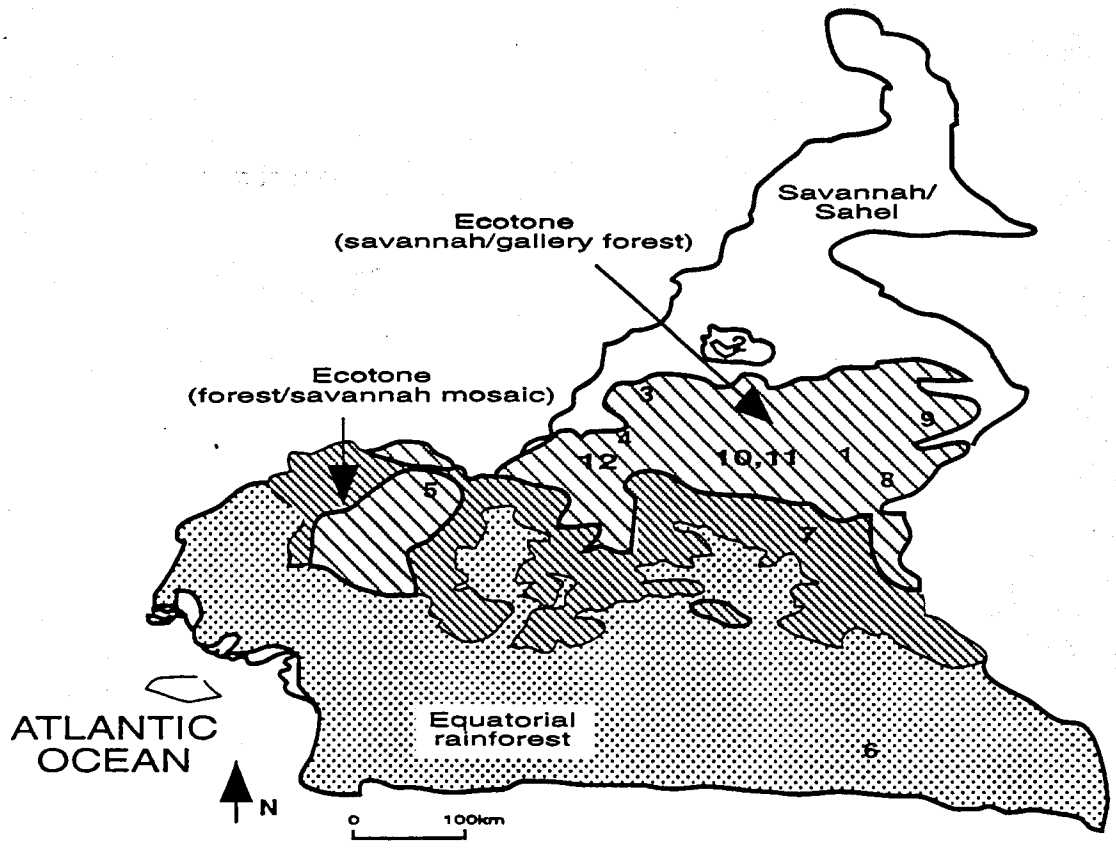

Figure 1. Map of Cameroon showing approximate locations of survey sites (see Table 1).

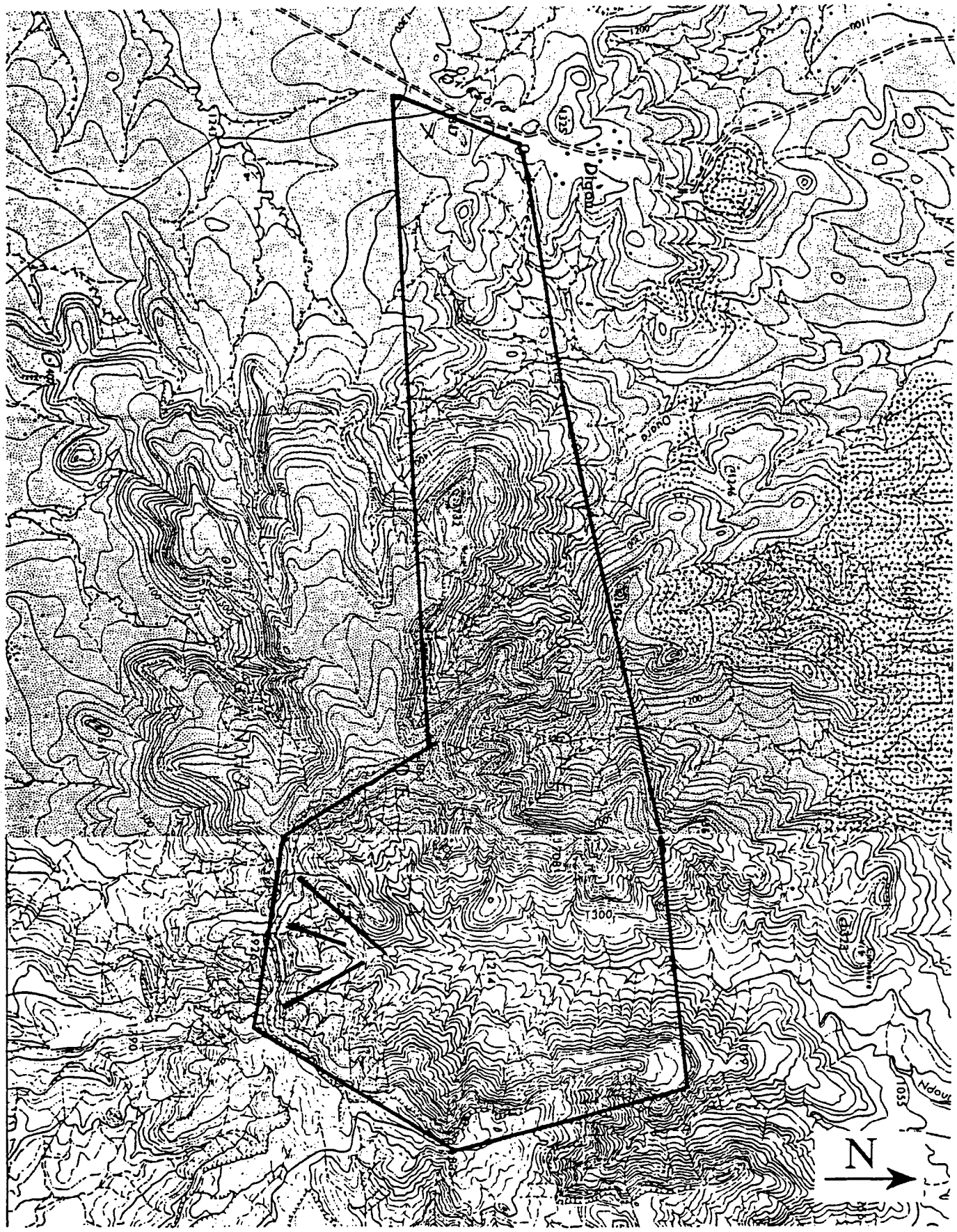

Figure 2a. Map of Mt. Ngang-Ha showing area surveyed and transect locations. Scale: 1 cm = 0.5 km.

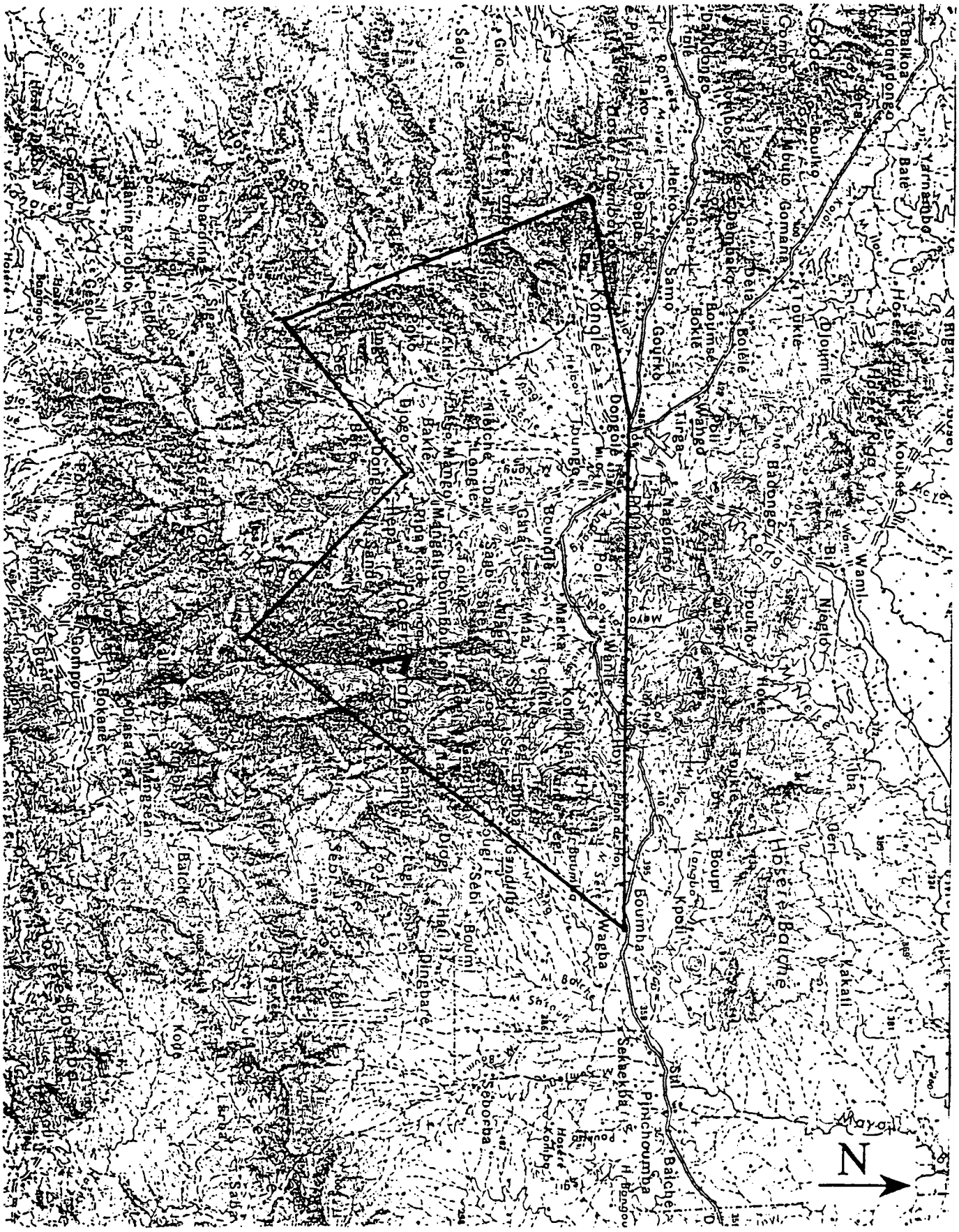

Figure 2b. Map of Hoséré Vokré showing area surveyed and transect locations. Scale: 1 cm = 2 km.

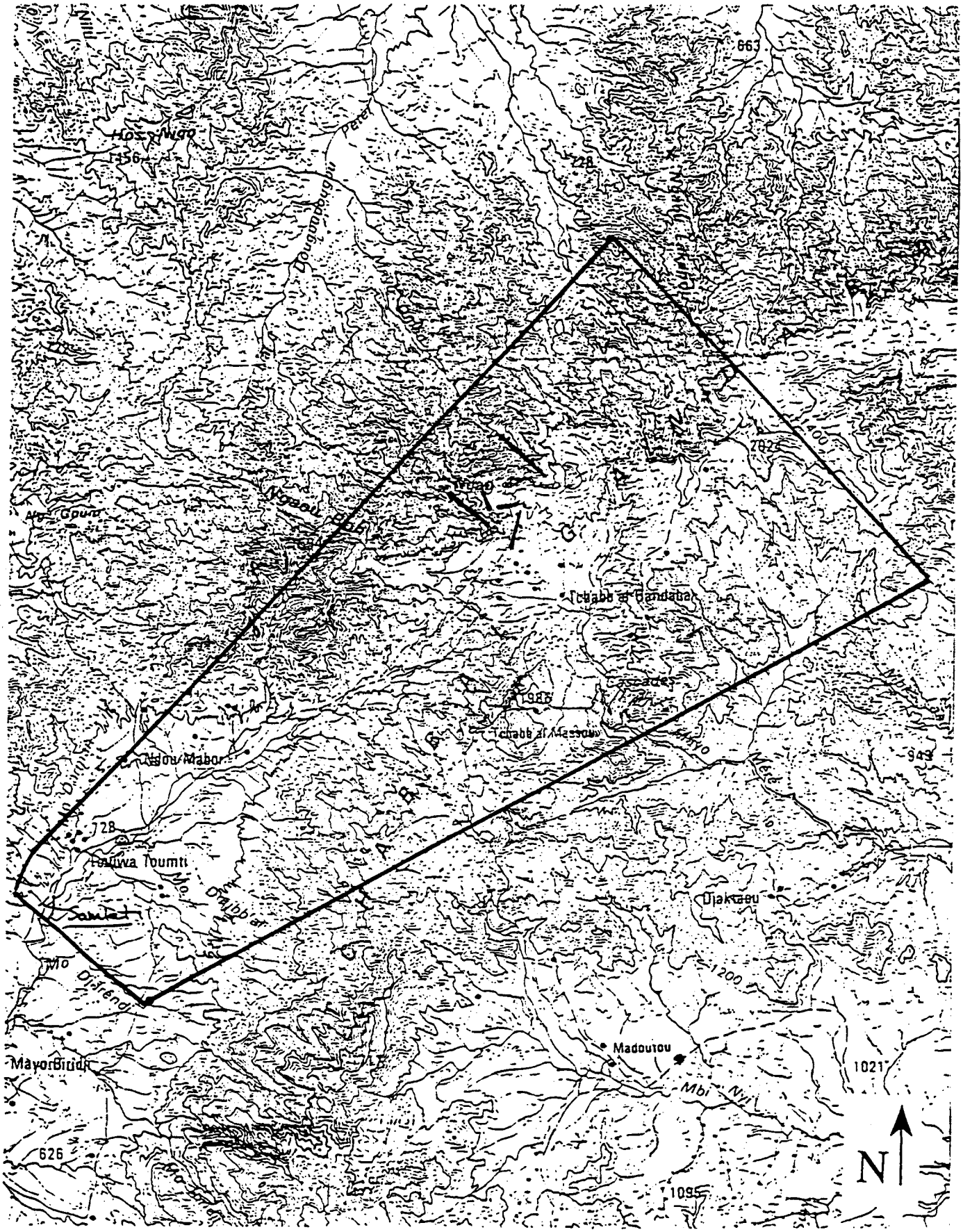

Figure 2c. Map of Tchabal Gandaba showing area surveyed and transect locatins. Scale: 1 cm = 1.5 km.

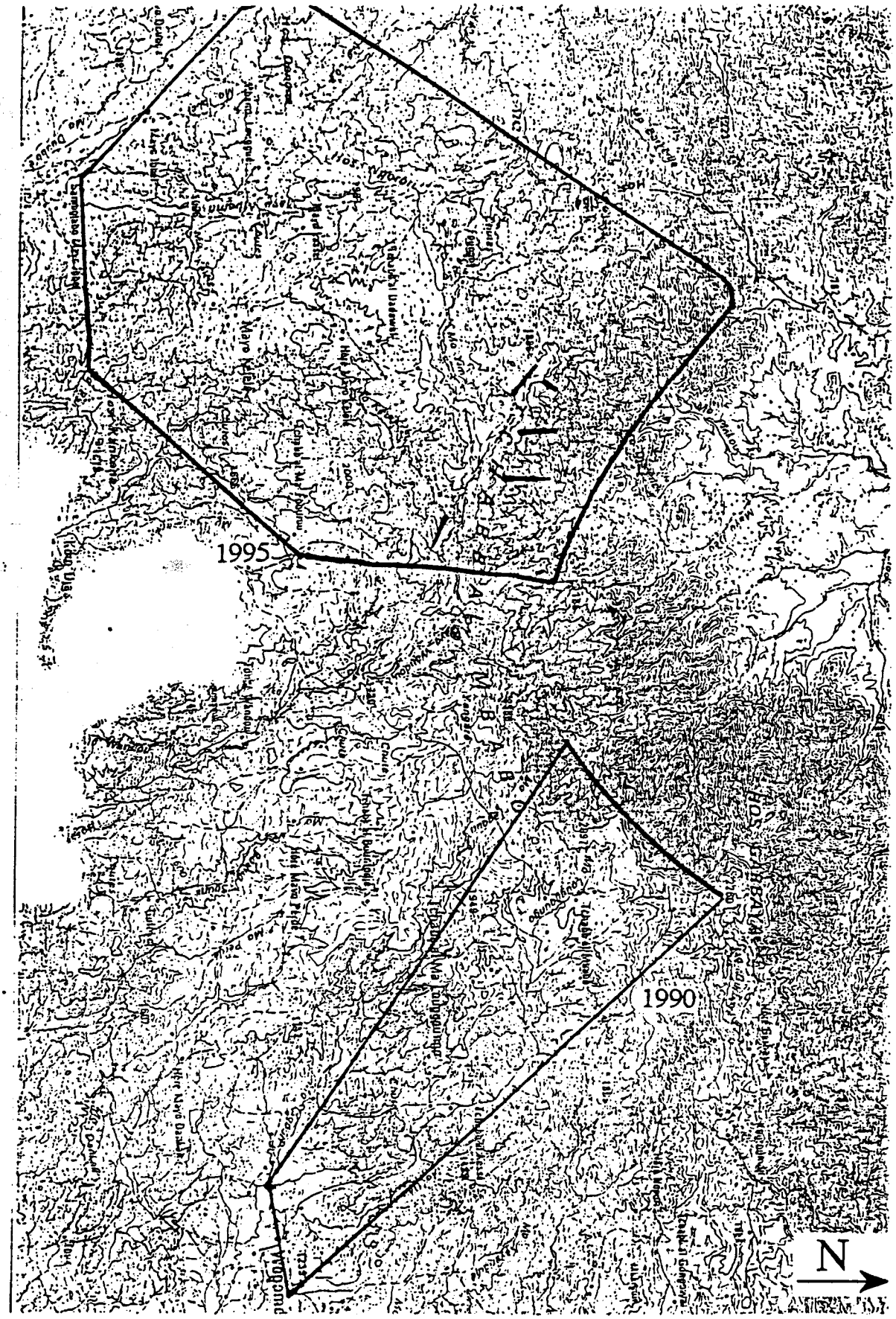

Figure 2d. Map of Tchabal Mbabo showing areas surveyed in 1990 and 1995, and locations of transects completed in 1995. Scale: 1 cm = 2 km.

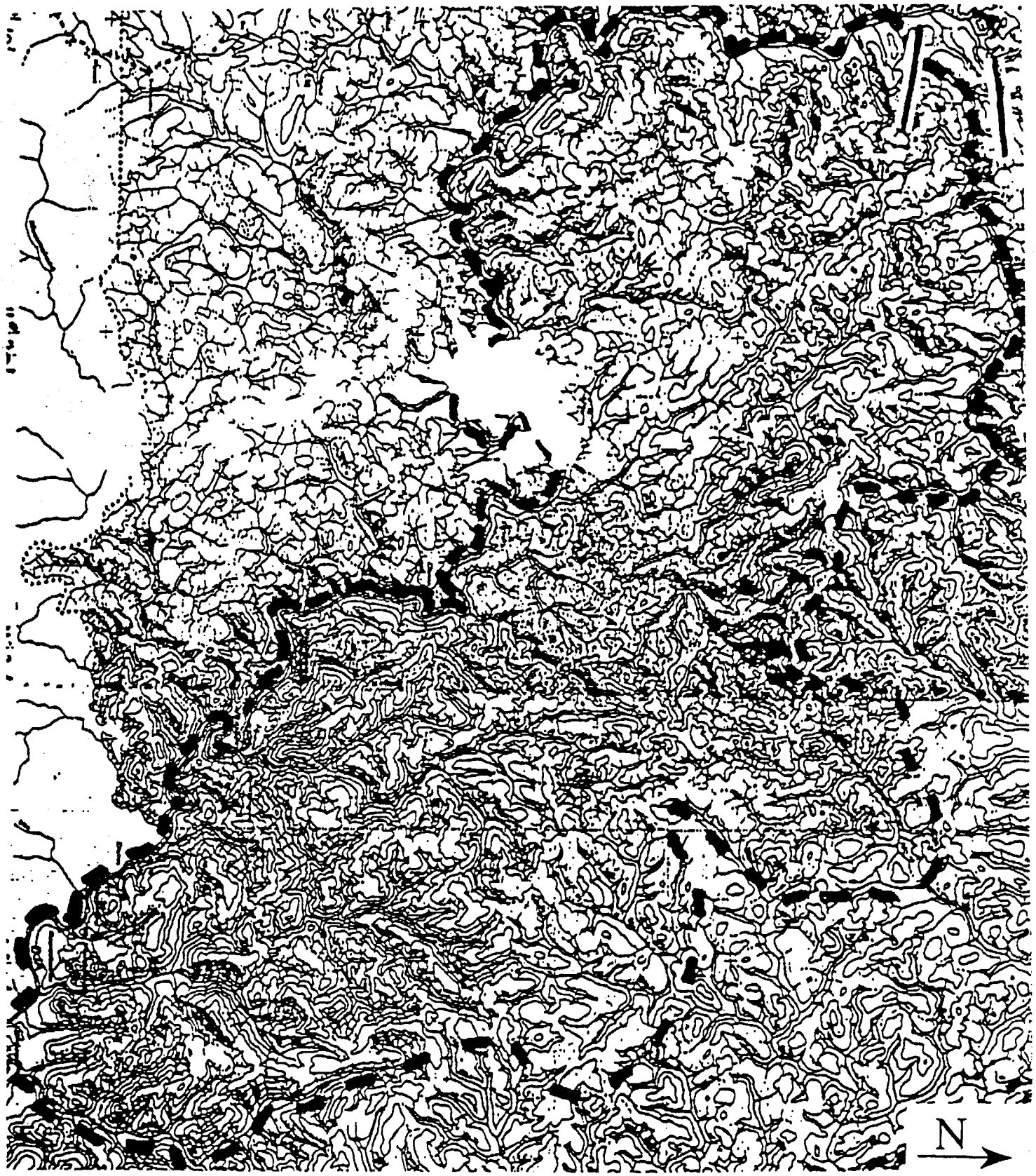

Figure 2e. Map of Nki, showing transect locations in northwest corner. Scale: 1 cm = 2.5 km.

VEGETATION

Vegetation was characterized for the four montane sites, Mt. Ngang-Ha, Hoséré Vokré, Tchabal Gandaba, and Tchabal Mbabo, and the lowland primary forest site near Ngoïla. Characterization consisted of an overview of existing forest types and identification of common tree and shrub species.

VERTEBRATE SPECIES RICHNESS AND RELATIVE ABUNDANCE

Mammals

Mammal surveys were conducted at all montane sites (except Kilum), and the lowland forest site. Surveys invovled cutting line transects and collecting data on mammal sign and sightings following standard protocols for determining species richness and relative abundance (NRC 1981; Barnes and Jensen 1987; Fay 1988; White 1994). Local guides and hunters were hired to assist with the cutting of transects and identification of animal sign. Total transect length varied for each site, depending on forest area, type, and time available. Data was taken in a manner consistent with determining species densities, however, because the number of sighting, dung and nest observations for each species was insufficient for reliable estimations of transect width (Fay 1988, Barnes and Jensen 1987, NRC 1981) we report only relative abundance for each species.

Relative abundance was determined by dividing transects into 100 m segments and recording presence or absence of sign for each species. Relative abundance, or frequency, is the percentage of segments on which sign was encountered. For the two montane-plateau sites, Tchabal Mbabo and Tchabal Gandaba, mammal species richness and relative abundance were determined separately for forests on the plateau and forest-slopes descending from the plateau. This was deemed necessary because the two forest types appeared to differ in both structure and extent of human impacts.

To obtain additional information on mammal species richness at each site, we interviewed hunters and guides as well as other local people. The later consisted mainly of local herders or farmers. Interviews were conducted using various mammal field guides in which interviewees were asked to identify from color plates those mammals which occurred and whether they were abundant. Those species which seemed likely to occur based on consistent identification of plates, accurate behavioral or other anecdotal evidence, and known habitat requirements and species geographic range, were included in the species lists.

Nomenclature of primates follows Napier and Napier (1994) and that of other mammals follows Dorst and Dandelot (1993).

Birds

Avian species richness and abundance was determined for all five montane sites, and six forest/savanna ecotone sites. Methods included the use of visual sightings and mist-netting.

Data collected from sightings included frequency with which species were seen and habitat in which they occurred. Habitats included savanna (S), forest (F) and savanna/forest edge (S/F). In some cases, such as forests on Tchabal Gandaba, habitat types were further divided into gallery forest located on the plateau, and those on slopes descending from the plateau. Categorizations for species abundance from visual sighting, included:

1. species seen once or rarely,

2. species seen more than once but not common,

3. species seen daily or common.

In general, more time was spent within forested areas than in the savanna, so reports of low abundance ratings for some savanna-obligate species are likely artificially low. Twelve meter (30 x 30 mm mesh) mist-nets were used. Ten to 33 mist-nets were erected in forest at each site along cleared net lanes. Nets were opened at sunrise (0600) and closed at between 1000 or 1100 depending on ambient air temperature. Some afternoon mist-netting was done when temperatures permitted. Total net-hours were calculated for each site. Birds were banded with numbered aluminum bands, sexed, aged and measured. Measurements include tarsus length, wing length, and weight, as well as several bill measures including length, depth and width of both upper and lower bills following Smith (1990). A small volume of blood (one or two drops) was removed by venipuncture of the caudal vein following Smith (1990). Blood was preserved in a buffer solution for subsequent molecular genetic analysis.

Relative abundance of bird species was determined from mist-netting (number of individuals caught per 1,000 meter-hours) and categorically, using subjective abundance estimates from sightings. Species nomenclature follows Louette (1981) and vernacular names are derived from various sources (Macworth-Praed and Grant 1981, Serle et al. 1977)

ASSESSING HUMAN IMPACTS AND ATTITUDES TOWARD WILDLIFE

Local people were interviewed at the four montane sites (excluding Kilum) and the lowland forest site. The interviews were structured so as to: 1) determine the extent of utilization of the forest by humans, including both the impacts on the forest and the degree of reliance by locals on forest products; 2) understand local attitudes about conservation; and 3) understand what local needs must be met for effective conservation to take place.

We attempted to obtain input from a cross section of the society at each site by interviewing each local tribe, and by interviewing both sexes and various age groups across livelihoods (typically herders, hunters and farmers).

RESULTS

MONTANE SITES

MT. NGANG-HA

Mount Ngang-Ha is located on the Adamawa Plateau in an area of wooded savanna approximately 60 km west of Ngaoundéré (Figure 2a). It is accessible via the village of Ngang-Ha which lies at the foot of the mountain to the northwest. The roads between Ngaoundéré (via the northern outskirts of the city near the University) and Ngang-Ha are in very good condition, making the village of Ngang-Ha readily accessible.

Much of the surrounding lowland area is heavily used for commercial agriculture, including large plantations of coffee and cotton. The mountain is considered sacred by the local tribe, the Mboum, who have utilized caves on the mountain for cultural and religious purposes for 100s of years (Kini, pers. comm.). The mountain spans an area of about 100 km^2. Most of this area is characterized by lightly wooded savanna with heavily forested portions covering between 2 and 5 km^2. Virtually all the more mesic forests occur along drainages descending the mountain. We surveyed the largest apparent tract of forest approximately 2 km^2 in size, located on the north slope of the mountain. This mesic section of forest began at an elevation of approximately 1,200 m and extended to a maximum elevation of 1,550 m. The lower limit for montane forest accepted by some

authors is 1,000 m (Morton 1972; Hall 1973; Morton 1986). The change from lowland forest to montane is gradual, however, and some authors classify the zone between 1,000 - 1,600 m as sub-montane (Letouzey 1968).

Vegetation

The extent of mesic forest on Ngang-Ha is limited. The largest section (the one surveyed) consists mostly of thin bands along streams, ranging in width from 50 to 200 m. Narrower strips of gallery forest extend to lower elevations in some instances. The diversity of forest tree species was quite high, as is typical of forests in this elevational range (Richards 1963; Hall 1973). Only one obligate montane species, *Maesa lanceolata*, was noted in the forest, although several high elevation species were present, including *Dracaena arborea,* the palm *Phoenix reclinata*, and *Croton sp.* These and other common species are listed in Table 2.

The larger forest patches on Ngang-Ha tend to be more mesic than small patches, as evidenced by larger trees with abundant epiphytic growth including various species of mosses, ferns and orchids. The diversity of tree orchids in particular seemed high for such small tract of forest and should be a priority in future work. Four distinct species were noted. Numerous patches of *Phoenix reclinata* were also found scattered throughout the forest, indicating the presence of springs.

The structure of the forest has been heavily impacted by the seasonal (September-October) grazing of cattle and burning by Fulani tribes people. On lower, less steep slopes, the understory is very sparse, and contains little woody growth, suggesting more intense grazing pressures. Large quantities of cattle dung were encountered on areas of lesser slope, as well as sign of extensive burning. Although the likely target of anthropogenic burning are the tall savanna grasses, many of these fires have historically extended in to the forest. The observed sharp delineation between forest and savanna may also be indicative of impacts of grazing and burning and suggests little seedling recruitment outside of the main body of the forest. The mesic nature of the remaining forests, and the fact that they persist today despite extensive burning, suggest they were historically more extensive before burning and cattle grazing.

Table 2. Common tree species on Mt. Ngang-Ha and their growth form.

Family	Species	Form
Mimosaceae	*Albizia zygia*	large tree
Araliaceae	*Schefflera sp.*	large tree
Euphorbiaceae	*Croton sp.*	medium tree
Fabaceae	*Pterocarpus sp.*	medium tree
Combretaceae	*Combretum molle*	medium tree
Arecaceae	*Phoenix reclinata*	medium tree
Agavaceae	*Dracaena arborea*	medium tree
Apocynaceae	*Tabernaemontana cordata*	small tree
Rubiaceae	*Rytigynia neglecta*	small tree
Myrsinaceae	*Maesa lanceolata*	small tree

Vertebrate Species Richness And Relative Abundance

Mammals

A total of 2,100 m of transect were cut and surveyed on Mt. Ngang-Ha between the elevations of 1230 m and 1505 m, which effectively covered the larger forest tracts in the area (Figure 2a).

The number and abundance of some forest obligate species was remarkable, considering the isolated nature and small size of the forest patches on the mountain.

Mammal species which were observed or confirmed by sign included three species of primates; anubis baboon (*Papio anubis*) black and white colobus (*Colobus guereza*) and tantalus monkey (*Cercopithecus aethiops tantalus).* Of these, colobus were most often observed in the forest, with a relatively high frequency of both sign (0.14) and visual sighting (0.14) on transects (Table 3). Incidental sightings included observations of groups consisting of up to 12 individuals, including sub-adults and infants. Groups of colobus were also observed rocky outcrops above the forest, suggesting they may easily move between forest patches on the mountain. The presence of what appeared to be large populations of colobus in such a small, isolated forest patch was striking.

Other large forest species included: western bush-pig (*Potamochoerus porcus porcus*) bay duiker (*Cephalophus dorsalis*), western bushbuck (*Tragelaphus scriptus scriptus*) and dwarf forest buffalo (*Syncerus caffer nanus*). Duiker sign was fairly common on transects (0.19), but it was not possible to differentiate sign of bay duiker from red-flanked duiker (*Cephalophus rufilatus*), a species less dependent on forest. The most common sign on transects was that of the bush-pig (0.48). Bush-pig were also observed twice in small groups near the forest edge. Red-flanked duiker, bay duiker and western bushbuck were also observed.

Table 3. Mammals occurring or likely to occur on Mt. Ngang-Ha. Occurrence is: A = species which were directly observed, B = species for which sign was observed, C = species deemed likely to occur based on interviews with locals. Frequencies of mammal sign and sighting were determined from presence/absence data for 100 m segments of transect, and calculated as the percentage of segments on which they occurred.

Species	Vernacular name	Occur.	Sign Frequency	Sighting Frequency
Heliosciurus gambianus	Red-legged squirrel	A	—	0.10
Thryonomys sp.	Cane rat	C	—	—
Cricetomys emini	Giant rat	C	—	—
Histrix cristata	Crested porcupine	B	0.07	—
Papio anubis	Anubis baboon	A	—	—
Cercopithecus aethiops tantalus	Green/Tantalus monkey	A	—	0.05
Colobus guereza	Black and white colobus	A	0.14	0.14
Viverra civetta	Civet	C	—	—
Phacochoerus aethiopicus	Warthog	C	—	—
Potamochoerus porcus porcus	Western bush-pig	A	0.48	—
Tragelaphus scriptus scriptus	Western bushbuck	A	0.14	—
Redunca sp.	Reedbuck	C	—	—
Procavia capensis	Rock hyrax	A	0.05	—
Cephalophus callipygus/rufilatus	Bay/Red-flanked duiker	A	0.19	—
Syncerus caffer nanus	Dwarf forest buffalo	B	0.10	—
Syncerus caffer caffer	Cape buffalo	C	—	—

Birds

Species observed or netted on Ngang-Ha are listed in Table 4. A total of 91 species were recorded, 59 of which are forest or forest edge species. Densities of most species were not high, as reflected by low capture rates. The species most frequently captured were *Cossypha polioptera*, *Hypergerus atriceps*, *Camaroptera brachyura*, *Turtur abyssinicus*, and *Ceyx picta*, which are all common species in most lowland gallery forests. The presence of *Tauraco persa*, which is known

from dense forest is notable, as is the presence of the montane forest species, *Bamenda apalis*, *Bradypterus cinnamomeus*, *Aplopelia larvata*, *Nectarinia preussi*, *Dryoscopus angolensis*, and *Pogoniulus coryphaeus*. The nearest previously recorded location for *B. cinnamomeus*, *A. larvata*, and *P. coryphaeus*, is Tchabal Mbabo (Louette 1981; Stuart 1986; Smith and McNiven 1993), 180 km to the east. *Nectarinia preussi* and *Dryoscopus angolensis* have both been previously recorded from nearby on the Adamawa Plateau (Louette 1981; Stuart 1986). *Apalis bamendae*, which we found breeding, is listed as "Vulnerable" by IUCN (Collar et al. 1994). Existing records from mid-altitudes from west and central Cameroon suggest it is a gallery specialist (Stuart 1986; Collar et al. 1994).

Table 4. Birds mist-netted and/or observed on Mt. Ngang-Ha, Cameroon, 25 May-3 June 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species appearing in bold are considered montane species by some authors. Capture rate is number of individuals caught per 1,000 m-hr.

Species	Vernacular name	Habitat	Abundance	Capture Rate
Gyps rüppellii	Rüppell's griffon	S	3	—
Polyboroides radiatus	African harrier hawk	S	2	—
Terathopius ecaudatus	Bateleur	S	1	—
Buteo auguralis	Red-necked buzzard	S	3	—
Hieraaetus spilogaster	African hawk-eagle	S,F	2	—
Falco biarmicus	Lanner falcon	S	1	—
Falco alopex	Fox kestrel	S	3	—
Francolinus bicalcaratus	Double-spurred francolin	S	2	—
Francolinus squamatus	Scaly francolin	F	3	—
Sarothrura sp.	Flufftail	F	1	—
Streptopelia semitorquata	Red-eyed dove	F/S	1	—
Turtur afer	Red-billed wood dove	F	2	0.38
Turtur abyssinicus	Black-billed wood dove	F	3	0.8
Aplopelia larvata	**Lemon dove**	F	1	0.1
Treron australis	African green pigeon	F	2	—
Tauraco persa	Green touraco	F	1	—
Tauraco leucolophus	White-crested touraco	F	3	—
Musophaga rossae	Lady ross's touraco	F,S/F	1	—
Cuculus solitarius	Red-chested cuckoo	F	3	—
Chrysococcyx klaas	Klaa's cuckoo	F	2	—
Centropus senegalensis	Senegal coucal	S	3	—
Bubo sp.	Eagle-owl	—	1	—
Apus barbatus	African black swift	S	3	—
Apus affinis	Little swift	S	2	—
Cypsiurus parvus	African palm swift	S	3	—
Ceyx picta	African pigmy kingfisher	F	3	0.8
Halcyon malimbica	Blue-breasted kingfisher	F	3	0.19
Halcyon chelicuti	Striped kingfisher	S	1	—
Halcyon leucocephala	Grey-headed kingfisher	F	1	0.1
Tockus nasutus	Grey hornbill	S	2	—
Lybius bidentatus	Tooth-billed barbet	F	2	—
Lybius vieilloti	Vieillot's barbet	S	1	—
Pogoniulus coryphaeus	**Western green tinkerbird**	F	1	0.1
Pogoniulus bilineatus	Lemon-rumped tinkerbird	F	3	0.1

Indicator indicator	Greater honeyguide	S,F	3	—
Indicator minor	Lesser honeyguide	F,S/F	2	—
Campethera cailliautii	Green-backed woodpecker	F	2	—
Dendropicos fuscescens	Cardinal woodpecker	F	2	0.1
Mesopicos goertae	Grey woodpecker	S, F	2	—
Hirundo abyssinica	Lesser striped swallow	S	2	—
Hirundo fuligula	African rock martin	S	3	—
Psalidoprocne petiti	Petit's roughwing	S	3	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S,F	2	—
Pycnonotus barbatus	Common bulbul	F	3	0.19
Andropadus virens	Little greenbul	F	3	0.29
Chlorocichla flavicollis	Yellow-throated leaf-love	F	1	
Phyllastrephus scandens	Leaf-love	F	3	0.29
Dryoscopus angolensis	**Pink-footed puffback**	F	2	—
Laniarius ferrugineus	Tropical boubou	S,F/S	3	—
Cercomela familiaris	Red-tailed chat	S	2	—
Myrmecocichla cinnamomeiventris	Cliff-chat	S	2	—
Cossypha polioptera	Grey-winged robin-chat	F	3	1.05
Cossypha albicapilla	White-crowned robin-chat	F	3	0.67
Cossypha niveicapilla	Snowy-headed robin-chat	F	2	0.38
Turdus pelios	African thrush	F	3	0.1
Turdoides reinwardii	Black-cap babbler	F	3	0.1
Bradypterus cinnamomeus	**Cinnamon bracken warbler**	F	3	0.1
Sphenoeacus mentalis	Moustached scrub-warbler	S	1	—
Cisticola cantans	Singing cisticola	S	2	0.19
Cisticola lateralis	Whistling cisticola	S	3	—
Cisticola anonyma	Chattering cicticola	S	2	—
Cisticola brunnescens	Pectoral-patch cisticola	S	1	—
Prinia subflava	Tawny-flanked prinia	S,F	3	0.29
Prinia leucopogon	White-chinned prinia	F	3	0.29
Apalis bamendae	**Bamenda apalis**	F	3	—
Apalis rufogularis	Buff-throated apalis	F	1	—
Drymocichla incana	Red-winged grey warbler	F	2	0.29
Hypergerus atriceps	Oriole warbler	F	3	0.8
Camaroptera brachyura	Grey-backed camaroptera	S,F	3	0.86
Eremomela pusilla	Green-backed eremomela	S,F	1	—
Sylvietta brachyura	Crombec/nuthatch warbler	F	1	—
Batis minor	Black-headed puff-back flycatcher	S	1	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	0.67
Trochocercus longicauda	Blue fairy flycatcher	F	3	0.29
Nectarinia verticalis	Green-headed sunbird	F	3	0.58
Nectarinia preussi	**Preuss's sunbird**	F	3	0.77
Nectarinia cuprea	Copper sunbird	S,F	3	0.1
Nectarinia coccinigaster	Splendid sunbird	F	3	—
Zosterops senegalensis	Yellow white-eye	S	2	—
Serinus mozambicus	Yellow-fronted canary	F,S/F	2	—
Clytospiza dybowskii	Dybowski's twinspot	S/F	3	0.67
Nesocharis capistrata	Grey-headed olive-back	F	1	0.19
Estrilda nonnula	Black-crowned waxbill	S/F	3	0.29
Ploceus baglafecht	Baglafecht's weaver	F	2	—
Ploceus ocularis	Spectacled weaver	—	—	0.38
Ploceus nigricollis	Black-necked weaver	F	2	—
Euplectes capensis	**Yellow bishop**	S	2	—
Onycognathus morio	Red-winged starling	S	3	—

Lamprotornis purpureus	Purple glossy starling	S	1	—
Cinnyricinclus leucogaster	Amethyst starling	S	2	—
Dicrurus ludwigii	Square-tailed drongo	F	3	0.1
Total species = 91	Individuals netted/1,000 m-hr = 11.60			

Human Impacts And Recommendations For Conservation

Human impacts are high in the area and result from both seasonal burning and grazing (Table 15). The greatest threat to the mountain is from Fulani herders who graze cattle and burn large areas on the mountain. These activities likely reduce and degrade the forest, decrease the probability of seedling recruitment, as well as altering the composition of the surrounding savanna. We noted considerable consternation by the local Mboum people regarding the burning activities by Fulani.

The direct use of wildlife by the Mboum people seems quite limited, as they are primarily agriculturists. The nearest villages are at the foot of the mountain, at least 15 km from the area of the mountain on which the most extensive forest is located, and most agricultural and hunting activities are concentrated near the villages. Most of the mountain and its forests are considered sacred, and access to the mountain is controlled by the chief in the village of Ngang-Ha, who has wide jurisdiction in the area. Hunting and agricultural activities for the village of Ngang-Ha and 15 satellite villages are also under the control of this chief. Major crops are maize, manioc, millet and yam, the most productive cash crops being millet and yams. Ngang-Ha and it's satellite villages are able to produce and sell enough that they can organize and contribute cash for projects such as schools (7 among the 15 villages:, medical facilities (1 hospital and 4 clinics), and the grading of roads which we found to be in very good condition. Hunting is generally accomplished by large hunting parties using bow and arrow and spears, but some individuals do hunt with guns. Hunted species include: duiker, bush buck, crested porcupine, and cane rat. Traditionally, hunting of cane rat (*Thryonomys sp.*) was accomplished by setting fires to chase animals into caves or rock overhangs, where they were speared. Cane rat are still hunted in this fashion in the dry season (December - February). Local people do not normally eat primate. There is a nearby hunting concession, but according to our guides, hunting on the mountain by outsiders is rare.

In sum, because the mountain is sacred, and local tribes are not dependent on it for their livelihood, the likelihood of promoting conservation activities among local peoples on Ngang-Ha appears high, especially if burning by Fulani can be halted.

Specific recommendations for Ngang-Ha should include efforts to halt burning of grasslands, limit cattle grazing to below 1,000 m and impose a complete ban on hunting on the mountain. As other montane areas in Cameroon exhibit higher biodiversity and are under greater threat, we do not recommend formal protection for the mountain at the present time. However, we strongly recommend that another survey be conducted in five years time to assess changes to the montane forest.

HOSÉRÉ VOKRÉ

Hoséré Vokré consists of a 36 km u-shaped ridge, opening to the town of Poli 5 km to the north (Figure 2b). Poli is readily accessible via a spur off the main road between Ngaoundéré and Garoua. The mountain has several possible access points. We made our ascent on a well used trail from the village of Boumba, 8 km east of Poli, and established a camp near the top of the ridge in the vicinity of Ninga (approximately a 5 hr hike).

Hoséré Vokré covers 360 square miles. Most of this area consists of xeric wooded savanna. More mesic forest patches are very small and widely scattered, typically occurring in narrow bands along streams .

Vegetation

The largest gallery we located was on a west facing slope about 3 km west of camp. This gallery was very narrow, averaging 10-20 meters in width, and extended for 1,200 m. Huge 10-15 m high boulders were found throughout, forming small caves many containing roosting fruit bats. The gallery reached its highest elevation at 1,600 m. The only other gallery of signifcant size in the survey area ran steeply down the ridge, in an approximately 5 m wide belt extending 750 m. The trees in both of these galleries were generally small (<30 cm DBH) although a few large trees were present. The upper canopy was dominated by *Syzygium guineensis*, a riverain species. *Phoenix reclinata*, another riverain species was also present. In spite of the presence of some riverain species, these galleries did not appear very mesic, as indicated by the paucity of epiphytes. *Podocarpus milanjianus* was the most common lower canopy tree. The presence of *Podocarpus*, a montane species (found in large numbers on Kilum to the south) and usually found at much higher elevations was salient (Letouzey 1968). On Vokré it exists as a small tree up to approximately 5 m in height. Another characteristic montane tree common in the galleries was *Hymenodictyon floribundum*. These and other common species are listed in Table 5.

A very small (5-10 m wide and 250 m long), more accessible gallery on the eastern end of the ridge, with a south-facing slope, was used for mist-netting. This gallery, consisted of small trees and shrubs and lacked *Podocarpus*.

Table 5. Common tree and shrub species on Hoséré Vokré and their growth form.

Family	Species	Form
Myrtaceae	*Syzygium guineensis (var. macrocarpum)*	large tree
Aracaceae	*Phoenix reclinata*	medium tree
Podocarpaceae	*Podocarpus milanjianus*	small tree
Rubiaceae	*Hymenodictyon floribundum*	small tree
Guttiferae	*Symphonia sp.*	small tree

Vertebrate Species Richness And Relative Abundance

Mammals

A total of 1,950 m of transect were completed on Vokré at elevations from 1325 m to 1495 m (Fig. 2b). Because of the large boulders, the interiors of the galleries were impassable, and transects were conducted along the edge of the galleries in some cases.

The frequency of all mammal sign on transects was extremely low as was the number of species encountered, particularly forest obligate species (Table 6). Three primate species were found on Vokré. They include anubis baboon, black and white colobus, and tantalus monkey. Tantalus monkeys were the most frequently seen on transects, followed by colobus and baboon. However, baboon groups as large as 25 individuals were observed. The two tantalus groups numbered 4 and 12, and the two colobus groups observed numbered 2 and 3 individuals. The colobus may have been the same group as they were seen in the same location on two consecutive days. Colobus are the only forest dependent species recorded for this mountain.

Table 6. Mammals occurring or likely to occur on Hoséré Vokré. Occurrence is: A = species which were directly observed, B = species for which sign was observed, C = species deemed likely to occur based on interviews with locals. Frequencies of mammal sign and sighting were determined from presence/absence data for 100 m segments of transect, and calculated as the percentage of segments on which they occurred.

Species	Vernacular name	Occur.	Sign Frequency	Sighting Frequency
Pteropodidae	Fruit bat	A	—	0.03
Lepus crawshayi	Crawshay's Hare	C	—	—
Thryonomys sp.	Cane rat	C	0.07	—
Cricetomys emini	Giant rat	C	—	—
Histrix cristata	Crested porcupine	C	—	—
Papio anubis	Anubis baboon	A	0.07	0.03
Cercopithecus aethiops tantalus	Green/Tantalus monkey	A	—	0.1
Colobus guereza	Black and white colobus	A	—	0.07
Felis (sylvestris) libyca	African wild cat	B	0.07	—
Phacochoerus aethiopicus	Warthog	B	0.07	—
Redunca sp.	Reedbuck	A	—	0.03
Procavia capensis	Rock hyrax	A	—	0.03
Sylvicapra grimmia	Grimm's duiker	A	—	0.03

Birds

Ninety-two species of birds were recorded on Vokré (Table 7). Of these, only 31 species are forest or forest edge species. The most frequently captured species in the forest were *Ceyx picta, Camaroptera brachyura, Lagonosticta rubricata, Cossypha niveicapilla*, common gallery species, and *Merops bulocki* and *Ploceus cucullatus*, common savanna species. Three species restricted to montane areas were recorded for this site. These were *Nectarinia preussi, Dryoscopus angolensis,* and *Bradypterus cinnamomeus*. According to (Stuart 1986), *B. cinnamomeus* is probably not forest dependent. Vokré is the northernmost record for these species, *B. cinnamomeus* having been recorded from Tchabal Mbabo (Smith and McNiven 1993) and the other two from the Adamawa Plateau (Louette 1981; Stuart 1986).

Table 7. Birds mist-netted and/or observed on Hoséré Vokré, Cameroon, 10-14 June, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Mist-netted birds were caught in forest. Species in bold are considered montane by some sources. Capture rate = number of individuals caught per 1,000 m-hr.

Species	Vernacular name	Habitat	Abun-dance	Capture rate
Bostrychia hagedash	Hadada ibis	S	1	—
Polyboroides radiatus	African harrier hawk	S	3	—
Circaetus cinereus	Brown snake eagle	S	1	—
Buteo auguralis	Red-necked buzzard	S	3	—
Polemaetus bellicosus	Martial eagle	S	2	—
Hieraaetus spilogaster	African hawk-eagle	S	2	—
Falco ardosiaceus	Grey kestrel	S	1	—
Falco tinnunculus	Common kestrel	S	1	—
Falco alopex	Fox kestrel	S	3	—
Francolinus bicalcaratus	Double-spurred francolin	S	3	—

Streptopelia lugens	Adamawa turtle dove	F	3	—
Turtur afer	Red-billed wood dove	S	1	—
Treron waalia	Bruce's green pigeon	S	1	—
Tauraco leucolophus	White-crested touraco	F	3	—
Musophaga rossae	Lady ross's touraco	F	1	—
Crinifer piscator	Western grey plantain-eater	S	2	—
Cuculus solitarius	Red-chested cuckoo	S	3	—
Chrysococcyx klaas	Klaa's cuckoo	S	3	—
Centropus senegalensis	Senegal coucal	S	2	—
Otus sp.	Scops owl	S	1	—
Bubo africanus	Spotted eagle-owl	F	1	—
Caprimulgus tristigma	Freckled nightjar	S	3	—
Apus barbatus	African black swift	S	1	—
Apus caffer	White-rumped swift	S	1	—
Cypsiurus parvus	African palm swift	S	3	—
Colius striatus	Speckled mousebird	S/F	1	—
Ceyx picta	African pigmy kingfisher	F	3	1.81
Halcyon malimbica	Blue-breasted kingfisher	F	1	—
Halcyon chelicuti	Striped kingfisher	S	2	—
Halcyon leucocephala	Grey-headed kingfisher	S	3	0.36
Merops bulocki	Red-throated bee-eater	S	3	1.08
Eurystomus glaucurus	Broad-billed roller	S	1	—
Tockus nasutus	Grey hornbill	S	3	—
Lybius dubius	Bearded barbet	S	1	—
Lybius bidentatus	Tooth-billed barbet	F	2	—
Lybius vieilloti	Vieillot's barbet	S	3	—
Pogoniulus chrysoconus	Yellow-fronted tinkerbird	S	3	0.72
Indicator sp.	Honeyguide	S	1	—
Mesopicos goertae	Grey woodpecker	S	1	—
Hirundo aethiopica	Ethiopian swallow	S	3	—
Hirundo abyssinica	Lesser striped swallow	S	3	—
Psalidoprocne petiti	Petit's roughwing	S	3	0.72
Anthus sp.	Pipit	S	1	—
Pycnonotus barbatus	Common bulbul	S,F	3	0.72
Phyllastrephus scandens	Leaf-love	F	3	—
Dryoscopus angolensis	**Pink-footed puffback**	F	1	—
Tchagra senegala	Black-headed tchagra	S	1	—
Laniarius ferrugineus	Tropical boubou	S,F	3	—
Cercomela familiaris	Red-tailed chat	S	2	—
Myrmecocichla cinnamomeiventris	Cliff-chat	S	2	—
Cossypha polioptera	Grey-winged robin-chat	F	2	—
Cossypha albicapilla	White-crowned robin-chat	F	1	—
Cossypha niveicapilla	Snowy-headed robin-chat	F	3	1.08
Turdus pelios	African thrush	S	3	0.36
Turdoides reinwardii	Black-cap babbler	F	2	0.36
Bradypterus cinnamomeus	**Cinnamon bracken warbler**	F	2	—
Sphenoeacus mentalis	Moustached scrub-warbler	F	1	—
Cisticola natalensis	Croaking cisticola	S	3	—
Cisticola sp.	Cisticola	S	3	—
Prinia subflava	Tawny-flanked prinia	S,F	3	—
Camaroptera brachyura	Grey-backed camaroptera	F	3	1.81
Melaenornis edolioides	Black flycatcher	S	2	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	—
Trochocercus longicauda	Blue fairy flycatcher	F	2	0.36

Terpsiphone viridis	Paradise flycatcher	S	3	—
Anthreptes longuemarei	Violet-backed sunbird	F	1	—
Nectarinia verticalis	Green-headed sunbird	S,F	3	0.72
Nectarinia senegalensis	Scarlet-chested sunbird	S,F	2	—
Nectarinia venusta	Variable sunbird	S,F	3	0.72
Nectarinia preussi	**Preuss's sunbird**	F	2	—
Nectarinia cuprea	Copper sunbird	S	3	0.36
Nectarinia pulchella	Beautiful long-tailed sunbird	S	3	—
Zosterops senegalensis	Yellow white-eye	S	1	—
Emberiza cabanisi	Cabani's bunting	S	1	—
Serinus mozambicus	Yellow-fronted canary	S	3	—
Clytospiza dybowskii	Dybowski's twinspot	F,S	3	0.36
Nesocharis capistrata	Grey-headed olive-back	—	—	0.72
Amadina fasciata	Cut-throat	S	1	—
Estrilda melipoda	Orange-cheeked waxbill	S	3	—
Estrilda nonnula	Black-crowned waxbill	S,F	2	—
Estrilda bengala	Red-cheeked cordon-bleu	S	3	—
Lagonosticta rubricata	African fire-finch	F	2	1.44
Lagonosticta rara	Black-bellied fire-finch	S	3	—
Lonchura cucullata	Bronze manikin	S	3	—
Ploceus baglafecht	Baglafecht's weaver	F	1	—
Ploceus cucullatus	Village weaver	S	3	1.08
Ploceus nigricollis	Black-necked weaver	F	2	—
Euplectes capensis	**Yellow bishop**	S	1	—
Euplectes macrourus	Yellow-mantled whydah	S	3	—
Onycognathus morio	Red-winged starling	S	3	—
Lamprotornis purpureus	Purple glossy starling	S	3	—
Cinnyricinclus leucogaster	Amethyst starling	S,F	3	—
Total number of species = 92	Individuals netted/1,000 m-hr = 14.80			

Human Impacts And Recommendations For Conservation

This mountain is densely inhabited (Fig. 2b). Human impacts are extremely high on the mountain and involve intensive cultivation of a large variety of crops, seasonal burning, heavy grazing, and hunting of all large animals including primates (Table 15). The direct use of wildlife by local people seems quite high and there appears to be little local interest among indigenous people toward conserving wildlife, as they consider all wildlife a threat to their crops. Indeed we found little wildlife left on the mountain to conserve. Perhaps the most important consideration should be the existence of remnant populations of *Podocarpus* on the mountain. Additionally, because of what appeared to be profound cultural differences among the various tribes which either occupy or utilize the mountain, including the Dupa, Doayo and Fulani, implementing conservation activities here would be a formidable task. We found merely attempting to organize a simple survey required many meetings, and much organization among the various groups, chiefs etc. Furthermore, according to local missionaries, the chiefs of the Dupa and Doayo exert little authority over the tribes people, making changes in land-use practices difficult. In terms of conservation potential, Vokré was the lowest of all sites surveyed.

Primary conservation efforts should be directed toward additional surveys of the southern portion of the mountain, as these areas are allegedly richer in biodiversity. Additionally, efforts should be made at determining the population size and extent of the range of *Podocarpus* . As other montane areas in Cameroon exhibit higher biodiversity and are ecologically more intact, we do not recommend efforts toward formal protection for the mountain at the present time.

TCHABAL GANDABA

Tchabal Gandaba comprises a 66 km long ridge running in a northeast arc from Tignère to Mana (Figure 2c). Access to the plateau from the north, via Mana, is limited to the dry season because of the difficulty of crossing the Faro river. During the rainy season we found the best access was via Sameleti, a small village 12 km to the west of the plateau. The road to Sameleti turns off the Tignère - Gadjiwan road just south of Gadjiwan. This 20 km road is impassable after a rain.

The region to the west of Tchabal Gandaba consists of heavily wooded savanna and is uninhabitable due to large populations tsetse flies. The savanna on the plateau consists of heavily grazed grassland with numerous large gallery forests which snake their way along abundant small streams on top of the plateau. Many large forest patches extend down the west and northwest facing slopes.

Vegetation

Two forest types occur on Tchabal Gandaba, gently sloped gallery forests on the plateau, and very steep (many as much as 70°) forests on the west and northwest facing slopes. The two forests surveyed on the slope were also different from each other in species composition and general structure, likely due to differences in orientation and runoff, and degree of shading by surrounding peaks. Common species are listed in Table 8.

The numerous galleries on the plateau ranged in width from 5-30 m and in length from 200-700 m . These galleries were quite mesic, with large numbers of epiphytes, including at least 5 species of orchids. They were dominated by the riverain species *Syzygium guineensis*, a large upper canopy tree. Another riverain species, *Phoenix reclinata*, and a marsh species, *Raphia farinifera* were also common. *Dracaena arborea*, *Phoenix reclinata*, *Croton sp.* and *Polyscias fulva* were also common. These species are common in many areas of the Adamawa Plateau.

Many of the plateau forests were heavily disturbed by cattle. The undergrowth was sparse and large eroded areas were present where cattle access streams. Consequently much of the water was fouled, and many areas of the plateau have been badly eroded by cattle.

The largest forest surveyed on the western slope contained many large trees (DBH > 100 cm). The canopy was quite open and was comprised of a diversity of tree species. However, the forest did not appear as moist as the plateau galleries. There were fewer palms and *Dracaena*, and no *Raphia* was noted. Epiphytes were present but not at the density seen in the gallery forest on the plateau. The understory was of a fairly mesic type, with many ferns, including broad leafed ferns. The montane shrub, *Brillantaisia nitens,* was common in the understory at higher elevations.

The second forest slope surveyed was drier than the first, and less shaded by surrounding ridges. It was less extensive, more open, with a mixed forest/savanna vegetation throughout. Undergrowth was sparse and often comprised of grasses. We noted few palms or epiphytes. *Croton sp.* and *Polyscias fulva*, both high elevation species, were noted in each of the forests but were less common on forest slopes, possibly because they require more moisture.

Table 8. Common tree and shrub species on Tchabal Gandaba and their growth form.

Family	Species	Form
Myrtaceae	*Syzygium guineensis (var. macrocarpum)*	large tree
Araliaceae	*Polyscias fulva*	large tree
Euphorbiaceae	*Croton sp.*	medium tree
Combretaceae	*Combretum molle*	medium tree
Tiliaceae	*Christiana africana*	medium tree

Agavaceae	*Dracaena arborea*	medium tree
Aracaceae	*Phoenix reclinata*	medium tree
Aracaceae	*Raphia farinifera*	small tree
Mimosaceae	*Albizia zygia*	small tree
Rubiaceae	*Tricalysia sp.*	small tree
Rubiaceae	*Rytigynia gracilipetiola*	small tree
Rubiaceae	*Mussaenda erythrophylla*	shrub
Vitaceae or Leeaceae	*Leea guineensis*	shrub
Acanthaceae	*Brillantaisia nitens*	shrub

Vertebrate Species Richness And Relative Abundance

Mammals

A total of 2,700 m of transects were walked on Tchabal Gandaba, including 1,200 m on the plateau and 1,500 m on forested slopes (Fig. 2c). The overall number of species occurring here is quite large due to the diversity of habitats on and around the plateau, and the large number of forest patches support a large number of forest obligate species (Table 9).

Three primates, anubis baboon, tantalus monkey, and black and white colobus were seen on the mountain, however, the tantalus monkey was not recorded on transects. Baboon sign was extremely high on the slope transects (0.4), and may be due to their apparent use of the smaller forest patches as a night roost. Colobus were found at high frequencies (0.13) on slope transects. They were also observed on two other forested slopes, as well as in several plateau galleries.

Western bushbuck was recorded from plateau galleries and five forest species, including colobus, bush-pig, bushbuck, giant forest hog (*Hylochoerus meinertzhageni*) and yellow-backed duiker (*Cephalophus silvicultor*), were recorded from transects on the forest slopes. Sign of both yellow-backed duiker and bushbuck was encountered frequently (0.20). Sign of forest hog was encountered only once, this species is alleged to be more common on the lower elevational slopes of the mountain.

Based on information derived from interviews, two other forest species, forest buffalo and leopard, probably occur on the forest slopes. Both species allegedly show altitudinal migrations with forest buffalo being more common in the early dry season (November -- December), and leopard in the late rainy season when the grass is high (September). Lion and cape buffalo are also said to move up slope during the late rainy season.

Table 9. Mammals occurring or likely to occur on Tchabal Gandaba. Occurrence is: A = species directly observed, B = species for which sign was observed, C = species deemed likely to occur based on interviews with locals. Frequencies of mammal sightings and sign were determined from presence/absence data for 100 m segments of transects, and calculated as the percentage of segments on which they occurred. S = slope forest and P = plateau forest.

Species	Vernacular name	Occur.	Sign		Sighting	
			S	P	S	P
Lepus crawshayi	Crawshay's hare	C	—	—	—	—
Thryonomys sp.	Cane rat	C	—	—	—	—
Cricetomys emini	Giant rat	C	—	—	—	—
Histrix cristata	Crested porcupine	B	0.13	—	—	—
Papio anubis	Anubis baboon	A	0.4	—	0.07	—

Cercopithecus aethiops tantalus	Tantalus Monkey	A	—	—	—	—
Colobus guereza	Black and white colobus	A	0.13	—	0.13	—
Canis sp.	Jackal (common / side-striped)	C	—	—	—	—
Viverra civetta	Civet	B	0.07	0.08	—	—
Genetta sp.	Genet	C	—	—	—	—
Crocuta crocuta	Spotted hyena	B	0.07	—	—	—
Felis caracal	Caracal	A	—	—	—	—
Panthera pardus	Leopard	C	—	—	—	—
Panthera leo	Lion	C	—	—	—	—
Phacochoerus aethiopicus	Warthog	B	0.13	0.08	—	—
Potamochoerus porcus porcus	Western bush-pig	B	0.07	—	—	—
Hylochoerus meinertzhageni	Giant forest hog	B	0.07	—	—	—
Tragelaphus scriptus scriptus	Western bushbuck	A	0.2	0.5	—	—
Redunca sp.	Reedbuck	C	—	—	—	—
Procavia capensis	Rock hyrax	C	—	—	—	—
Cephalophus rufilatus	Red-flanked duiker	A	0.07	—	—	—
Cephalophus silvicultor	Yellow-backed Duiker	B	0.2	—	—	—
Syncerus caffer nanus	Dwarf forest buffalo	C	—	—	—	—
Syncerus caffer caffer	Cape buffalo	C	—	—	—	—

Birds

Species richness and capture rates were higher on Tchabal Gandaba than on any of the other mountains (Table 10). A total of 138 species were recorded and the capture rate was 47 individuals per 1,000 m-hr, a rate almost twice that recorded for Tchabal Mbabo. Capture rates were particularly high for 3 sunbird species, including *Nectarinia preussi, Nectarinia venusta*, and *Nectarinia verticalis*; the bulbul *Andropadus virens,* and the kingfisher Ceyx *picta.*

Only three montane species, *Bradypterus cinnamomeus*, *Nectarinia preussi,* and *Dryoscopus angolensis*, were recorded in plateau forest. The forest slopes, however, harbored at least 10 montane species, including *Apalis bamendae*, *Aplopelia larvata, Andropadus tephrolaemus, Laniarius atroflavus, Muscicapa adusta, Nectarinia oritis*, and *Linurgus olivaceus*, as well as the three species found on the plateau. *Aplopelia larvata, Laniarius atroflavus, Bradypterus cinnamomeus*, and *Linurgus olivaceus*, have previously been recorded from Tchabal Mbabo (Louette 1981; Smith and McNiven 1993). Both *Nectarinia preussi* and *D. angolensis* have previously been recorded from the Adamawa Plateau (Louette 1981; Stuart 1986). The other four species have been previously recorded only as far north as the Bamenda Highlands (Louette 1981; Stuart 1986).

Both *Laniarius atroflavus* and *Nectarinia oritis* are endemic to the mountain regions of western Cameroon and eastern Nigeria (Elgood et al 1994, Stuart et al. 1986) while *Apalis bamendae* is endemic to the Cameroon highlands and is listed as "Vulnerable" by IUCN (Collar et al. 1994).

The observation of *Cossypha natalensis* from the forested slope represents a significant range extension and only the third record for Cameroon, the other two being from Yaoundé (Louette 1981) and Bétaré Oya (Smith unpub. see this report).

Table 10. Birds mist-netted and/or observed on Tchabal Gandaba, Cameroon, 19-24 June, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, Fp = forest on plateau, Fs = forest on slopes, S/F = savanna/forest edge. All mist-netted birds were caught in plateau forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular name	Habitat	Abundance	Capture rate
Scopus umbretta	Hammerkop	S	2	—
Anas sparsa	African black duck	Fp	2	—
Gyps rüppellii	Rüppells griffon	S	3	—
Gyps bengalensis	African white-backed vulture	S	1	—
Polyboroides radiatus	African harrier hawk	S	1	—
Terathopius ecaudatus	Bataleur	S	2	—
Melierax gabar	Gabar goshawk	S	1	—
Buteo auguralis	Red-necked buzzard	S	2	—
Lophaetus occipitalis	Long-crested hawk-eagle	S	1	—
Polemaetus bellicosus	Martial eagle	S	2	—
Hieraaetus spilogaster	Africal hawk-eagle	S	1	—
Falco peregrinus	Peregrin falcon	S	1	—
Falco tinnunculus	Common kestrel	S	2	—
Falco alopex	Fox kestrel	S	2	—
Francolinus bicalcaratus	Double-spurred francolin	S	3	—
Francolinus squamatus	Scaly francolin	Fp,Fs	3	—
Numida meleagris	Helmeted guineafowl	S	1	—
Limnocorax flavirostra	Black crake	Fp	1	—
Vanellus senegallus	African wattled lapwing	S	1	—
Streptopelia semitorquata	Red-eyed dove	S	2	—
Turtur tympanistria	Tambourine dove	Fp	3	1.54
Turtur afer	Red-billed wood dove	Fp	2	—
Turtur abyssinicus	Black-billed wood dove	S	1	—
Aplopelia larvata	**Lemon dove**	**Fs**	**1**	—
Treron australis	African green pigeon	Fp	2	—
Tauraco leucolophus	White-crested touraco	S,Fp,Fs	3	—
Musophaga rossae	Lady ross's touraco	Fp	2	—
Crinifer piscator	Western grey plantain-eater	S	2	—
Cuculus solitarius	Red-chested cuckoo	Fp,Fs	3	—
Chrysococcyx klaas	Klaa's cuckoo	Fs	3	—
Chrysococcyx cupreus	Emerald cuckoo	Fs	1	—
Centropus senegalensis	Senegal coucal	S,Fp,Fs	3	—
Bubo sp.	Eagle-owl	heard	3	—
Macrodipteryx vexillarius	Pennant-winged nightjar	S	1	—
Apus aequatorialis	Mottled swift	S	1	—
Apus barbatus	African black swift	S	1	—
Colius striatus	Speckled mousebird	Fp,Fs	2,3	—
Ceyx picta	African pigmy kingfisher	Fp	3	2.32
Halcyon malimbica	Blue-breasted kingfisher	Fp,Fs	1	—
Halcyon chelicuti	Striped kingfisher	S	1	—
Halcyon leucocephala	Grey-headed kingfisher	S	2	—
Merops bulocki	Red-throated bee-eater	S	3	0.19
Eurystomus glaucurus	Broad-billed roller	S	1	—
Phoeniculus purpureus	Green wood-hoopoe	S	1	—

Lybius dubius	Bearded barbet	S	2	0.39
Lybius bidentatus	Tooth-billed barbet	S,Fp,Fs	3	0.39
Pogoniulus chrysoconus	Yellow-fronted tinkerbird	S	3	0.39
Pogoniulus bilineatus	Lemon-rumped tinkerbird	Fp,Fs	3	0.58
Indicator indicator	Greater honeyguide	Fp,Fs	2	—
Indicator minor	Lesser honeyguide	Fs	1	—
Campethera caillianti	Green-backed woodpecker	Fs	1	—
Dendropicos fuscescens	Cardinal woodpecker	Fp,Fs	2	0.19
Mesopicos goertae	Grey woodpecker	S,Fp,Fs	3	—
Galerida modesta	Sun lark	S	2	—
Riparia cincta	Banded martin	S	1	—
Hirundo abyssinica	Lesser striped swallow	S	3	—
Hirundo fuligula	African rock martin	S	3	—
Psalidoprocne petiti	Petit's roughwing	S,Fp,Fs	3	0.97
Motacilla vidua	African pied wagtail	Fs	1	—
Anthus novaeseelandiae	Richard's pipit	S	1	—
Macronyx croceus	Yellow-throated longclaw	S	3	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	Fp	1	—
Pycnonotus barbatus	Common bulbul	S,Fp,Fs	3	0.39
Andropadus virens	Little greenbul	Fp,Fs	3	4.44
Andropadus tephrolaemus	**Mountain greenbul**	Fs	1	—
Chlorocichla flavicollis	Yellow-throated leaf-love	Fp,Fs	3,2	1.74
Phyllastrephus scandens	Leaf-love	Fp,Fs	3	0.19
Dryoscopus angolensis	**Pink-footed puffback**	Fp,Fs	1	—
Tchagra minuta	Black-cap tchagra	S	3	—
Laniarius ferrugineus	Tropical boubou	Fp,Fs	3,2	0.58
Laniarius atroflavus	**Yellow-breasted boubou**	Fs	3	—
Lanius collaris	Fiscal shrike	S	1	—
Saxicola torquata	Stonechat	S	1	—
Myrmecocichla cinnamomeiventris	Cliff-chat	S	3	—
Cossypha polioptera	Grey-winged robin-chat	Fp	3	1.16
Cossypha natalensis	Red-capped robin-chat	Fs	1	—
Cossypha albicapilla	White-crowned robin-chat	Fp	3	0.58
Cossypha niveicapilla	Snowy-headed robin-chat	S,Fp	3	0.58
Turdus pelios	African thrush	S,Fp,Fs	3	0.39
Malacocincla cleaveri	Black-cap iliadopsis	—	—	0.39
Turdoides reinwardii	Black-cap babbler	Fp,Fs	3	0.19
Bradypterus cinnamomeus	**Cinnamon bracken warbler**	Fp,Fs	3	0.39
Sphenoeacus mentalis	Moustached scrub-warbler	S	3	—
Cisticola natalensis	Croaking cisticola	S	3	—
Prinia subflava	Tawny-flanked prinia	S	3	—
Prinia leucopogon	White-chinned prinia	Fp,Fs	3	1.35
Apalis flavida	Yellow-chested apalis	Fs	1	—
Apalis bamendae	**Bamenda apalis**	Fs	1	—
Drymocichla incana	Red-winged grey warbler	Fp,Fs	2	0.97
Hypergerus atriceps	Oriole warbler	Fp,Fs	3	1.16
Camaroptera brachyura	Grey-backed camaroptera	S,Fp,Fs	3	1.93
Eremomela pusilla	Green-backed eremomela	Fp	3	—
Sylvietta brachyura	Crombec/nuthatch warbler	Fs	1	—
Muscicapa adusta	**Dusky flycatcher**	Fs	1	—
Melaenornis edolioides	Black flycatcher	S,Fp,Fs	2	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	Fp,Fs	3	3.48
Trochocercus longicauda	Blue fairy flycatcher	S,Fp,Fs	3	0.58
Terpsiphone viridis	Paradise flycatcher	Fs	1	—

Parus leucomelas	Black tit	S	1	—
Anthreptes longuemarei	Violet-backed sunbird	S	1	—
Nectarinia oritis	**Cam. Blue-headed sunbird**	Fs	1	—
Nectarinia verticalis	Green-headed sunbird	S,Fp,Fs	3	2.12
Nectarinia venusta	Variable sunbird	S,Fp,Fs	3	4.83
Nectarinia preussi	**Preuss's sunbird**	Fp,Fs	3	8.5
Nectarinia bouvieri	Orange-tufted sunbird	Fp	1	—
Nectarinia cuprea	Copper sunbird	S	2	—
Nectarinia coccinigaster	Splendid sunbird	S	1	—
Zosterops senegalensis	Yellow white-eye	Fp,Fs	3	—
Serinus mozambicus	Yellow-fronted canary	S,Fp,Fs	3	0.39
Linurgus olivaceus	**Oriole finch**	Fs	2	—
Clytospiza dybowskii	Dybowski's twinspot	Fp,Fs	2	0.19
Nesocharis capistrata	Grey-headed olive-back	—	—	0.58
Estrilda melipoda	Orange-cheeked waxbill	S,Fp,Fs	2	0.19
Estrilda nonnula	Black-crowned waxbill	S,Fp,Fs	3	—
Estrilda astrild	Common waxbill	S	1	—
Estrilda bengala	Red-cheeked cordon-bleu	S	3	—
Lagonistica rara	Black-bellied fire-finch	S	2	—
Lonchura cucullata	Bronze manikin	S	3	—
Ploceus baglafecht	Baglafecht's weaver	Fp,Fs	2	0.58
Ploceus cucullatus	Village weaver	S	3	—
Ploceus ocularis	Spectacled weaver	Fp,Fs	2	—
Ploceus nigricollis	Black-necked weaver	Fp,Fs	2	1.54
Quelea erythrops	Red-headed quelea	S	1	—
Euplectes capensis	**Yellow bishop**	S	3	0.77
Euplectes macrourus	Yellow-mantled whydah	S,S/F	2	—
Vidua macroura	Pin-tailed whydah	S	3	—
Grafisia torquata	White-collared starling	S	2	—
Onycognathus morio	Red-winged starling	S	3	—
Cinnyricinclus leucogaster	Amethyst starling	S	2	—
Buphagus africanus	Yellow-billed oxpecker	S	1	—
Oriolus auratus	African golden oriole	Fp,Fs	1	—
Dicrurus ludwigii	Square-tailed drongo	Fs	2	—
Total number of species = 132	Individuals netted/1,000 m-hr = 47.12			

Human Impacts And Recommendations For Conservation

There are essentially two zones to consider when assessing human impacts on Tchabal Gandaba; the plateau and the steep west facing slopes. The plateau is under heavy grazing pressure by Fulani herdsman that have inhabited the plateau for at least two generations and likely longer. Grazing occurs year round on the plateau, although some herders migrate down to the plain in the dry season (Table 15). The high grazing pressure keeps down thatch, and as a result burning is necessary only in some years. We observed considerable erosion of grassland on the plateau from overgrazing. Despite this gallery forests on the plateau are extremely rich and had the highest densities of birds recorded. The only other form of agriculture conducted on the plateau is the cultivation of corn and other subsistence crops around villages. There seems to be little hunting pressure on the plateau. Although the west facing slope is rich in large mammals, lion, forest and cape buffalo occur, and is contiguous with the Faro Reserve to the west, little hunting seems to be conducted on these slopes. During interviews conducted in four villages either on or near the mountain, people identified only one individual "Samedu" as a proficient hunter, and even in this instance he also herded cattle. The potential for conservation activities in this area is very

favorable. Surrounding tribes make little use of the plateau, and therefore do not see conservation of the plateau as a threat to their livelihood. The Fulani we spoke to, while not opposed to conservation, foresaw potential conflicts including a likely reduction of grazing area and increases in the number of predators. Working closely with the Fulani population and assisting them with basic health care and education opportunities, the two greatest needs that they communicated to us, could provide incentives to reduce grazing impacts and place a moratorium on hunting. Protestant missions based in Gadjiwan are already conducting annual vaccination programs in the valley and on the plateau (in November), and are subsidizing schools at the base of the mountain (e.g. Sameleti). Thus there is potential for collaborative efforts which could enhance existing programs and simultaneously win support for sustainable conservation efforts.

Specific conservation recommendations are as follows:

• conduct further surveys which focus on the NW facing forested slopes and those directly north of the mountain. French safari hunters have at least one established camp at the northern base of the mountain, where "game" including elephant, lion and many species of antelope are common. We were unsuccessful at reaching this area because the rivers to the south and the Faro river to the north were impassable. The ideal time of year for these surveys would be December and January.

• begin feasibility study for establishing a protected area which includes the gallery forests on the plateau and NW facing forested slopes. Many possibilities exist for limiting cattle from forest in the area, including both traditional barbed wire and electric fencing.

TCHABAL MBABO

Tchabal Mbabo is a 25 km bowl shaped east-west ridge (Figure 2d). The thinly populated region to the north is characterized by thickly wooded savanna, and eventually joins the Faro Reserve. The north and west facing slopes are extensively forested with dense, highly mesic, montane forest. On the plateau itself are numerous large tracts of gallery forest. The extent of forest area existing on the ridge, although in need of quantification, is likely to rival that found on Mt. Cameroon.

Vegetation

The montane mesic forest extends from the plateau at 2,010 m down to approximately 1,600 m, narrowing further below this elevation into gallery forest, and thickly wooded savanna. The gallery forests on the plateau can be as large as 50 m wide and 1,500 m long. In cases where they are steep (>60% slope), the forests have a well developed dense understory with woody shrubs. Where they are less steep, the understory is comprised primarily of low herbaceous cover.

The forested slopes are quite steep, with slopes up to seventy degrees. The understory near the forest edge tends to be herbaceous, but the undergrowth of the forest interior is highly variable, ranging from open herbaceous undergrowth to dense shrub. The upper canopy of these forests is dominated by characteristic montane species, including *Syzygium staudtii, Schefflera abyssinica* and *Carapa grandiflora* (Table 11). The forests are extremely mesic, with a very high density and diversity of epiphytes, including ferns, mosses, orchids, and luxuriant growths of large, hanging lichens. The moistness of the forests results from the pattern of precipitation caused by the ridge, which traps clouds and mist, creating a rain-shadow to the south. We frequently experienced heavy rains down slope while the plateau was sunny.

On the plateau the sharply defined borders between forests and savanna, and the absence of trees and scrub within the grassland savanna, suggest the distribution of forest is determined in part by the effects of cattle grazing and burning, rather than other biotic factors. In contrast, just a few hundred meters down slope where the effects of grazing and fire are minimal, the montane forest grades into wooded savanna with no perceptible demarcation.

Three species frequently associated with grassland and forest openings, *Adenocarpus mannii* and *Phillipia mannii*, and *Aguaria salicifolia* (Richards 1963; Morton 1986) were common, but found only in association with the forest. There is little of this type of ericaceous woodland remaining in the montane region of Cameroon (Morton 1986). Some high elevation woodland areas remain on parts of Tchabal Mbabo which could be of this type. If so, they would be worth locating and conserving.

Table 11. Common tree and shrub species on Tchabal Mbabo and their growth form.

Family	Species	Form
Myrtaceae	*Syzygium staudtii*	large tree
Araliaceae	*Schefflera abyssinica*	large tree
Meliaceae	*Carapa grandiflora*	large tree
Euphorbiaceae	*Croton sp.*	medium tree
Mimosaceae	*Albizia sp.*	small tree
Ericaceae	*Aguaria salicifolia*	small tree
Ericaceae	*Adenocarpus mannii*	shrub
Ericaceae	*Phillipia mannii*	shrub
Rubiaceae	*Rytigynia gracilipetiolata*	small tree
Rubiaceae	*Hymenodictyon floribundum*	small tree
Rubiaceae	*Psycotria peduncularis*	shrub
Rubiaceae	*Mussaenda erythrophylla*	shrub
Thymelaeaceae	*Gnidia glauca*	shrub
Tiliaceae	*Christiana africana*	shrub
Vitaceae or Leeaceae	*Leea guineensis*	shrub

Vertebrate Species Richness And Relative Abundance

Mammals

A total of 4,100 m of transects were run on Tchabal Mbabo, with 1,900 m on the plateau and 2,200 m on the forested slope. As on Tchabal Gandaba, there was a marked difference between the number of forest species encountered in slope and plateau forests, with the number of species higher in the former (Table 12). The frequency of sign was generally higher than other sites. This is in spite of the fact that precipitation was presumably higher, causing dung to decay rapidly. For instance we recorded cape buffalo dung to disappear within three days.

Yellow-backed duiker and western bushbuck were common in both forest types, but sign of giant forest hog was encountered only on the slope forests, as was that for the forest buffalo, western bush-pig, leopard (*Panthera pardus*) and golden cat (*Felis aurata*).

According to our guides giant hog are found only on forest slopes and warthogs only on the plateau. Measurements taken of track appear to substantiate this - tracks on the plateau were 4-5 cm wide and 4.5-6 cm long, while those found on the slope were approximately 6 cm wide by 7 cm long. In the absence of any other information, we will report forest hog from the slope and warthog from the plateau.

Leopard is apparently common on Tchabal Mbabo. Tracks and bedding areas were encountered several times. A leopard was encoutered (heard giving territorial grunts) on one trasect. According to local herdsman, lion, which use to be common, have not been seen in recent years. This information runs counter to that provided by locals on the plateau nearer Galim (Smith

and McNiven 1993) who, in 1990, reported that lion were numerous. Whether or not this indicates a decline since 1990 is unclear.

Species which were not sighted on transects but were observed at other times are yellow-backed and bay duiker, as well as daily sightings of a small group of four black colobus in the plateau galleries, and small groups of tantalus monkeys. Baboons were common on the plateau, often consisting of troops of 30 individuals, including juveniles and infants. Anteater (*Orycteropus afer*) burrows were also abundant in the savanna, and fresh tracks of spotted hyena (*Crocuta crocuta*) were found each morning near camp.

Two threatened species, the endangered African wild dog (*Lycaon pictus*) (Groombridge 1994) and golden cat (*Felis aurata*), (listed as "K", likely threatened but data is insufficient to determine its status) (Groombridge 1994) both likely occur on the mountain. Although wild dog was not encountered, identification of plates by local herders, along with their description of its characteristic diurnal behavior of hunting in packs suggest it likely occurs. If confirmed it would make the mountain one of the few areas in West Africa where wild dogs occur (D. Girman, pers. com.).

Additionally, based on interviews with hunters it is possible that banded duiker (*Cephalophus zebra*) occur on the mountain. Given its distinctive pelage it is unlikely that it would be confused with another species. This would be a very significant finding, as its known distribution is limited to mountain areas in west Africa excluding Cameroon. Due to the uncertainty about this species it is inserted in Table 12 with reservations, as indicated by the asterisks.

Table 12. Mammals occurring or likely to occur on Tchabal Mbabo. Occurrence is: A = species directly observed, B = species for which sign was observed, C = species deemed likely to occur based on interviews with locals. Frequencies of mammal sign and sighting were determined from presence/absence data for 100 m sections of transect, and calculated as the percentage of segments on which they occurred. S = slope forest, P = plateau forest. Species names followed by asterisks (**) are included with reservations as discussed in the text.

Species	Vernacular name	Occur.	Sign		Sighting	
			S	P	S	P
Lepus crawshayi	Crawshay's hare	C	—	—	—	—
Histrix cristata	Crested porcupine	B	0.05	—	—	—
Atherurus sp.	Brush-tailed porcupine	B	—	—	—	—
Papio anubis	Anubis baboon	A	0.05	0.05	—	—
Cercopithecus aethiops tantalus	Green/Tantalus monkey	A	—	—	—	—
Colobus guereza	Black and white colobus	A	—	—	—	—
Canis sp.	Jackal (common / side-striped)	B	—	—	—	—
Viverra civetta	Civet	C	—	—	—	—
Crocuta crocuta	Spotted hyena	B	—	—	—	—
Lycaon pictus	African wild dog	C	—	—	—	—
Felis (sylvestris) libyca	African wild cat	C	—	—	—	—
Felis caracal	Caracal	C	—	—	—	—
Felis aurata	Golden cat	B	0.05	—	—	—
Felis serval	Serval	C	—	—	—	—
Panthera pardus	Leopard	B	0.14	—	—	—
Panthera leo	Lion	C	—	—	—	—

Orycteropus afer	Aardvark	B	—	—	—	—
Phacochoerus aethiopicus	Warthog	B	—	0.42	—	—
Potamochoerus porcus porcus	Western bush-pig	B	0.05	—	—	—
Hylochoerus meinertzhageni	Giant forest hog	B	0.36	—	—	—
Tragelaphus scriptus scriptus	Western bushbuck	A	0.27	0.37	0.05	—
Redunca sp.	Reedbuck	C	—	—	—	—
Procavia capensis	Rock hyrax	C	—	—	—	—
Cephalophus rufilatus	Red-flanked duiker	C	—	—	—	—
Cephalophus silvicultor	Yellow-backed duiker	A	0.27	0.16	—	—
Cephalophus dorsalis	Bay duiker	A	—	—	—	—
Cephalophus zebra **	Banded Duiker **	**	—	—	—	—
Syncerus caffer nanus	Dwarf forest buffalo	B	0.09	—	—	—
Syncerus caffer caffer	Cape buffalo	B	0.45	—	0.05	—

Birds

A total 86 species were recorded on Tchabal Mbabo. However, overall species counts were likely lower due to the extremely rainy weather we experienced during our work. Densities were intermediate among the four montane sites (Table 13). We recorded 24 montane forest species, more than at any other site, and two montane savanna species (*Cisticola pectoralis* and *Euplectes capensis*). Of the forest species, 14 have been recorded previously from Tchabal Mbabo (Louette 1981; Smith and McNiven 1993). Several species had not previously been recorded here, and constitute significant range extensions. Previous records for *Mesopicos elliotii*, *Andropadus montanus*, *Laniarius fülleborni*, *Phyllastrephus poensis*, *Cossypha isabellae*, *Malacocincla poliothorax*, *Muscicapa adusta*, *Ploceus melanogaster*, are from locations in the northern Bamenda Highlands, 200 km distant (Louette 1981, Stuart 1986). *Turdus gurneyi* has previously been recorded from the Obudu Plateau and Mt. Kupe, 300-400 km distant (Louette 1981, Elgood 1994), and *Dryoscopus angolensis* has been previously recorded from as far north as Ngaoundéré on the Adamawa Plateau (Louette 1981). Two other montane forest species *Nectarinia oritis* and *Serinus burtoni,* which were found by Smith and McNiven (1993) during an earlier survey, were not recorded on this survey.

Several species of potential importance to conservation occur here, of which six are endemic to montane areas in western Cameroon and eastern Nigeria (Elgood 1994, Louette 1981), and three are threatened or potentially threatened. *Ploceus bannermani*, an endemic forest-edge species, is listed as "Vulnerable" by IUCN, and *Andropadus montanus* also endemic, is listed as near-threatened (Collar et al. 1994). *Apalis pulchra* , while not currently listed, is restricted to the more northerly mountains where forest clearing is seriously threatening its habitat (Stuart 1986). Non-threatened endemic species include *Laniarius atroflavus*, *Phyllastrephus poensis*, *Cossypha isabellae*, and *Nectarinia oritis*.

Table 13. Birds mist-netted and/or observed on Tchabal Mbabo, Cameroon, 13-20 July, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold represent recognized montane species. Capture rate is number of individuals caught per 1,000 m-hr.

Species	Vernacular name	Habitat	Abun-dance	Capture rate
Anas sparsa	African black duck	F	1	—
Gyps bengalensis	African white-backed vulture	S	1	—
Nephron monachus	Hooded vulture	S	2	—

Polyboroides radiatus	African harrier hawk	S	2	—
Terathopius ecaudatus	Bateleur	S	2	—
Stephanoaetus coronatus	Crowned eagle	F	1	—
Aquila wahlbergi	Wahlberg's eagle	S	1	—
Elanus caeruleus	Black-shouldered kite	S	1	—
Falco tinnunculus	Common kestrel	S	2	—
Falco alopex	Fox kestrel	S	1	—
Francolinus bicalcaratus	Double-spurred francolin	S	3	—
Francolinus squamatus	Scaly francolin	F	3	—
Streptopelia semitorquata	Red-eyed dove	F,F/S	1	—
Turtur tympanistria	Tambourine dove	F	3	0.17
Turtur afer	Red-billed wood dove	S,F	3	—
Aplopelia larvata	**Lemon dove**	F	2	—
Treron australis	African green pigeon	F	1	—
Tauraco persa	Green touraco	F	3	—
Cuculus solitarius	Red-chested cuckoo	S,F	3	—
Centropus senegalensis	Senegal coucal	S,S/F	3	—
Tyto alba	Barn owl	S/F	1	—
Bubo sp.	Eagle-owl	—	—	—
Apus barbatus	African black swift	S	2	—
Colius striatus	Speckled mousebird	F,S/F	3	—
Apaloderma vittatum	**Bar-tailed trogon**	F	1	—
Alcedo leucogaster	White-bellied kingfisher	—	—	0.17
Merops bulocki	Red-throated bee-eater	S	1	—
Lybius bidentatus	Tooth-billed barbet	S,F	2	—
Pogoniulus bilineatus	Lemon-rumped tinkerbird	F	2-3	—
Mesopicos elliotii	**Elliot's woodpecker**	F	2	—
Riparia cincta	Banded martin	S	3	—
Hirundo fuligula	African rock martin	S	3	—
Psalidoprocne petiti	Petit's roughwing	S,F	3	—
Motacilla clara	**Mountain wagtail**	F	1	—
Macronyx croceus	Yellow-throated longclaw	S	3	—
Pycnonotus barbatus	Common bulbul	S,F	3	—
Andropadus virens	Little greenbul	F	2	0.87
Andropadus montanus	**Cameroon mountain greenbul**	F	1	—
Andropadus tephrolaemus	**Mountain greenbul**	F	3	6.08
Phyllastrephus poensis	**Cameroon olive greenbul**	F	2	—
Dryoscopus angolensis	**Pink-footed puffback**	F	2	—
Dryoscopus sabini	Sabine's puffback	F	1	—
Tchagra senegala	Black-headed tchagra	S	1	—
Laniarius ferrugineus	Tropical boubou	F	1	—
Laniarius atroflavus	**Yellow-breasted boubou**	F	3	0.52
Laniarius fülleborni	**Fülleborn's black boubou**	—	—	0.17
Saxicola torquata	Stonechat	S/F	3	—
Myrmecocichla cinnamomeiventris	Cliff-chat	S	3	—
Cossypha isabellae	**C. mountain robin-chat**	F	3	1.91
Cossypha polioptera	Grey-winged robin-chat	F	2	0.35
Cossypha niveicapilla	Snowy-headed robin-chat	F	2	0.35
Turdus pelios olivaceus	**African thrush/olive thrush**	S,F	3	0.35
Turdus gurneyi	**Orange ground-thrush**	F	3	1.56
Alcippe abyssinica	**African hill babbler**	F	3	1.91
Malacocincla poliothorax	**Grey-chested iliadopsis**	F	2	0.52
Malacocincla cleaveri	Black-cap iliadopsis	F	1	—
Bradypterus cinnamomeus	**Cinnamon bracken warbler**	F	3	0.52

Schoenicola platyura	Fan-tailed swamp warbler	S/F	1	—
Cisticola hunteri	**Hunter's cisticola**	F	3	0.87
Cisticola natalensis	Croaking cisticola	S	1	—
Cisticola brunnescens	Pectoral-patch cisticola	S	2	—
Prinia subflava	Tawny-flanked prinia	S,F	3	—
Prinia leucopogon	White-chinned prinia	F	2	—
Apalis pulchra	**Black-collared apalis**	F	3	1.7
Apalis cinerea	**Grey apalis**	S,F	?	0.35
Muscicapa adusta	**Dusky flycatcher**	S,F	2	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	0.35
Trochocercus longicauda	Blue fairy flycatcher	S,F	3	—
Nectarinia preussi	**Preuss's sunbird**	F	3	3.13
Linurgus olivaceus	**Oriole finch**	F	3	1.0
Clytospiza dybowskii	Dybowski's twinspot	F,S/F	2	—
Hypargos nitidulus	Green-backed twinspot	—	—	0.17
Nesocharis ansorgei	**White-collared olive-back**	F	2	0.17
Pytelia hypogrammica	Yellow-winged pytilia	S	3	—
Estrilda nonnula	Black-crowned waxbill	S/F	2	—
Estrilda astrild	Common waxbill	S	2	—
Amandava subflava	Zebra waxbill	SF	2	—
Ploceus baglafecht	Baglafecht's weaver	F	2	—
Ploceus bannermani	**Bannerman's weaver**	F/S	3	0.35
Ploceus melanogaster	**Black-billed weaver**	F	2	0.35
Ploceus dorsomaculatus	Yellow-capped weaver	F	2	—
Euplectes capensis	**Yellow bishop**	S	2	—
Vidua macroura	Pin-tailed whydah	S	1	—
Buphagus africanus	Yellow-billed oxpecker	S	2	—
Total species = 86	Individuals netted/1,000 m-hr = 24.0			

Human Impacts And Recommendations For Conservation

Tchabal Mbabo offers one of the most exiting conservation opportunities for protecting montane forest in Cameroon. The extent of mountain forests is likely greater than any mountain in the region, and in our view rivals Mt. Cameroon. Furthermore, unlike many of the montane regions to the south, human impacts are comparatively less. Like Tchabal Gandaba there are essentially two zones in which to consider human impacts on Tchabal Mbabo, the plateau and the steep north facing slopes. The plateau is under heavy grazing pressure by Fulani herdsman that have inhabited the plateau for at least three generations. We documented considerable erosion of the grasslands on the plateau due to overgrazing, though it was considerably less severe than that seen on Tchabal Gandaba (Table 15). Despite this however, the gallery forests on the plateau were generally rich in both birds and mammals. Hunting on the plateau and on the north facing slopes is limited, and is not conducted by Fulani, but by hunters from Nigeria and from as far south as Bamenda. We were informed of these activities but did not directly observe them. Furthermore, the local inhabitants do not endorse this practice and would likely fully support its cessation. The steep forest slopes do not permit easy access, and there appears to be little use of the forest for firewood collecting, unlike many montane forests in southern Cameroon. The potential for successfully implementing conservation activities in this area are very high. Working closely with the Fulani population and the Yem-Yem, assisting them with basic health care and education opportunities, the two greatest needs that they communicated to us, could provide incentives to reduce over-grazing and help implement a moratorium on hunting. The Protestant mission in Galim presently maintains a dispensary, providing the potential for collaborative efforts between NGO's and the mission to expand rural aid programs. We found both the Fulani and the Yem-Yem very receptive

to the idea of conserving the northern slopes and gallery forests. Great care, however, will be required in addressing the grazing issue as this is the main livelihood in the region and local herdsman would be very wary of any proposals or regulations regarding their cattle. Immediate action must also be made to halt the practice of burning galleries on the plateau to plant corn. This new practice that began within the last five years, appears to result from Fulani hiring Nigerian laborers to cultivate corn. The practice, if continued, is likely to severely impact existing galleries on the plateau in the next ten years. With minimal assistance we believe the Fulani could be convinced to stop this practice. Another aspect of the social environment of the region is the powerful regional control of the Yem-Yem chiefs. By working closely with the Yem-Yem chief in Sambolabo and the Sultan of the Yem-Yem in Galim we believe conservation plans could be implemented and effectively enforced. We found both individuals to be enlightened leaders, who expressed to us their interest in conserving the mountain ecosystem.

We strongly believe Tchabal Mbabo offers the greatest potential for sustainable conservation action of any montane site. The results of our survey along with previous work by Smith and McNiven (1993) suggest Tchabal Mbabo offers tremendous potential in maximizing protection of many critical montane species. The mountain is sparsely populated, with human activities limited to cultivation and cattle grazing. While cattle grazing may extend to the steep north facing slopes we found little evidence of cattle actually on these slopes. Furthermore, the rough and precipitous nature of the forest makes human intrusions difficult and dangerous. This is in contrast with other montane areas to the south, including Mt. Cameroon, Mt. Kupe, and Kilum which are rich in endemic species, but where either agricultural activity, overgrazing and/or hunting pressures are more intense (Collar and Stuart 1988). Considerable pristine habitat could be conserved if a portion of the gallery forests on the plateau, the north facing forest slope and the savanna woodlands below could be preserved. This would also protect a potentially critical altitudinal migration corridor for many species and maximize the chance of preserving an intact ecological community.

Below we identify conservation actions which should be undertaken as soon a possible for Tchabal Mbabo:

• Begin implementation of a comprehensive feasibility study for establishment of a park or other protected area. The protected region should include gallery forests on the plateau, the forested north-facing slope and wooded savanna north to near Dodéo. It should include the western escarpment, extending from Hoséré Gelbe and Hoséré Danoua to Hoséré Bong Bong and Hoséré Garbaya to the east.

• The feasibility study should include both biotic and human components. Biotic work should include further surveys of birds and mammals, including mist-netting and the use of photographic techniques to document mammal diversity. A more thorough examination of the vegetation and the herpetological fauna should also be implemented. Density estimates of predator populations including wild dog, spotted hyena, lion and leopard should made. Altitudinal zonation studies for target bird and mammal species should be undertaken and attempts should be made toward understanding potential temporal patterns of altitudinal migration and the importance of habitats for species occurring both on the mountain and in the adjacent savanna.

• Efforts should be made to assess the ecological impacts of Fulani and Yem Yem in the region and mitigation efforts should be developed to minimize these impacts. These should include, but not be limited to, the effects of grazing, fire and hunting. Conservation activities should be integrated with programs to assist local herders and farmers with less destructive agricultural methods. General assistance in the form of health care and primary education should be considered as a means of winning support. These could be accomplished collaboratively through working with existing programs run by Protestant missions based in Galim and Ngaoundéré.

• Immediate action should be taken to stop the burning of galleries to plant corn. From interviews and past survey work conducted by Smith and McNiven (1993) it is apparent that this is a new activity. Unless rapid action is undertaken the likelihood of further destruction of plateau gallery forest resulting from this practice is high.

KILUM

Table 14. Birds mist-netted and/or observed on Kilum (Mt. Oku), Cameroon, 21-26 July, 1995. Species in bold represent recognized montane species. Capture rate is number of individuals caught per 1,000 m-hr.

Species	Vernacular Name	Capture rate
Andropadus tephrolaemus	**Mountain greenbul**	5.67
Cossypha isabellae	**Cameroon mountain robin-chat**	6.80
Alcippe abyssinica	**African hill babbler**	4.54
Apalis pulchra	**Black-collared apalis**	6.80
Trochocercus albiventris	White-bellied flycatcher	2.27
Nectarinia oritis	**Cameroon Blue-headed sunbird**	12.47
Nectarinia preussi	**Preuss's sunbird**	13.61
Linurgus olivaceus	**Oriole finch**	3.40
Cryptospiza reichenowii	**Red-faced crimson-wing**	15.87
Ploceus bannermani	**Bannerman's weaver**	0.88
Ploceus nigricollis	Black-necked weaver	0.88

SUMMARY OF MONTANE SITES

Vertebrate Species Richness And Relative Abundance

Mammals

Of the mountains surveyed, Tchabal Mbabo had the greatest species richness, both overall and for forest requiring species (Figure 3). This estimate of species richness is based on the number of species which were observed or for which sign was observed, during our survey. Tchabal Gandaba and Mt. Ngang-Ha also had a high degree of overall and forest species richness. Hoséré Vokré was lowest in overall species richness and only one forest species, the black and white colobus, was observed.

The relative abundance of forest species as estimated from sign encountered on transects, is highest for Tchabal Mbabo, and Mt. Ngang-Ha, and only slightly lower for Tchabal Gandaba (Figure 4). The degree of precipitation on Tchabal Mbabo was such that no dung was observed while cutting transects. One off transect observation of fresh buffalo dung which disappeared in four days, indicates that dung of smaller animals was unlikely to be observed after even one day. Therefore relative abundance was compared among sites using only other types of sign such as tracks, sleeping places and signs of foraging. The high species richness and relative abundance of forest species of Mt. Ngang-Ha is impressive given its degree of isolation and the diminutive size of its forest. No sign of forest animals was encountered on transects on Hoséré Vokré.

On Tchabal Mbabo and Tchabal Gandaba, the two plateaus, transects were cut on the plateau for comparison with the larger forests on the slopes. Figure 5 shows relative abundance for individual forest requiring species on slopes and plateaus. It is apparent that, at this time of year at

least, more species tend to utilize the slopes than plateaus. This may be typical due to the smaller size of forests on the plateaus, as well as the greater utilization of the plateaus by people and cattle. Hoever, the bushbuck in both forest types.

Although all three primate species (anubis baboon, tantalus monkey, and black and white colobus) were observed on each of the mountains, none were sighted on transects on Tchabal Mbabo. This may have been due to the poor weather conditions we encountered while there. Both Tchabal Gandaba and Mt. Ngang-Ha had a high relative abundance of black and white colobus (Figure 6). All three primate species were sighted on transects on Hoséré Vokré. This is due to the extremely narrow nature of the gallery forest there, resulting in the inclusion of a great deal of surrounding savanna in the transect.

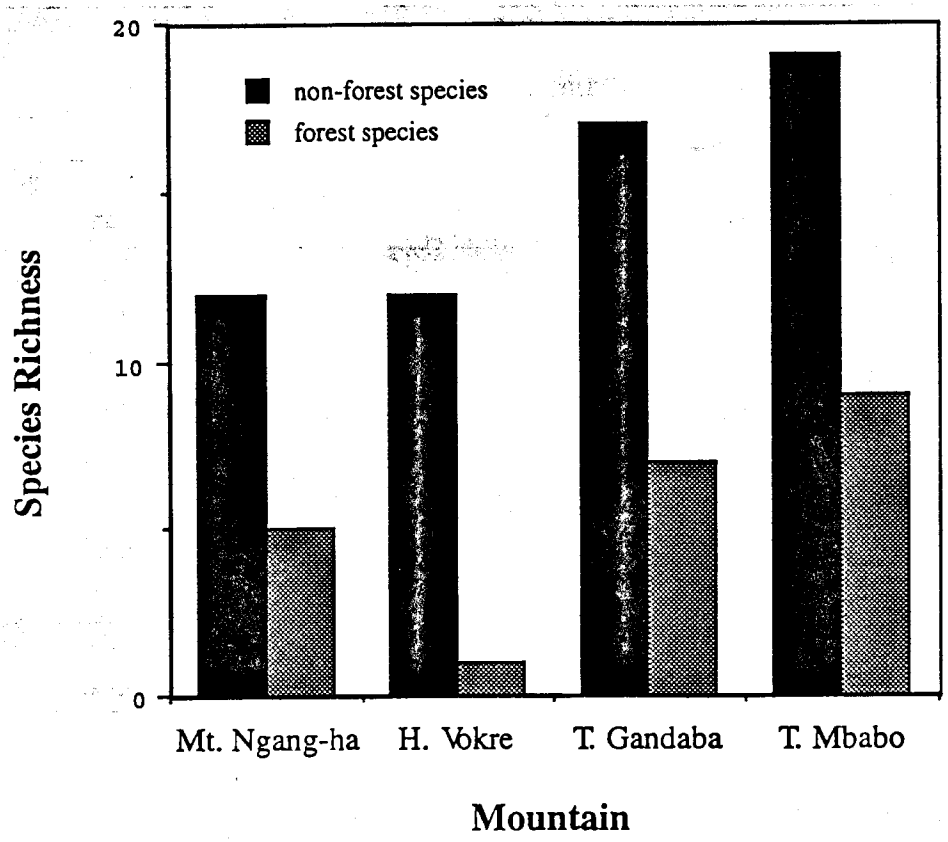

Figure 3. Species richness on four montane sites. Species richness = number of species which were observed or for which sign was observed during the duration of each mountain survey. Includes observations made both on and off transects.

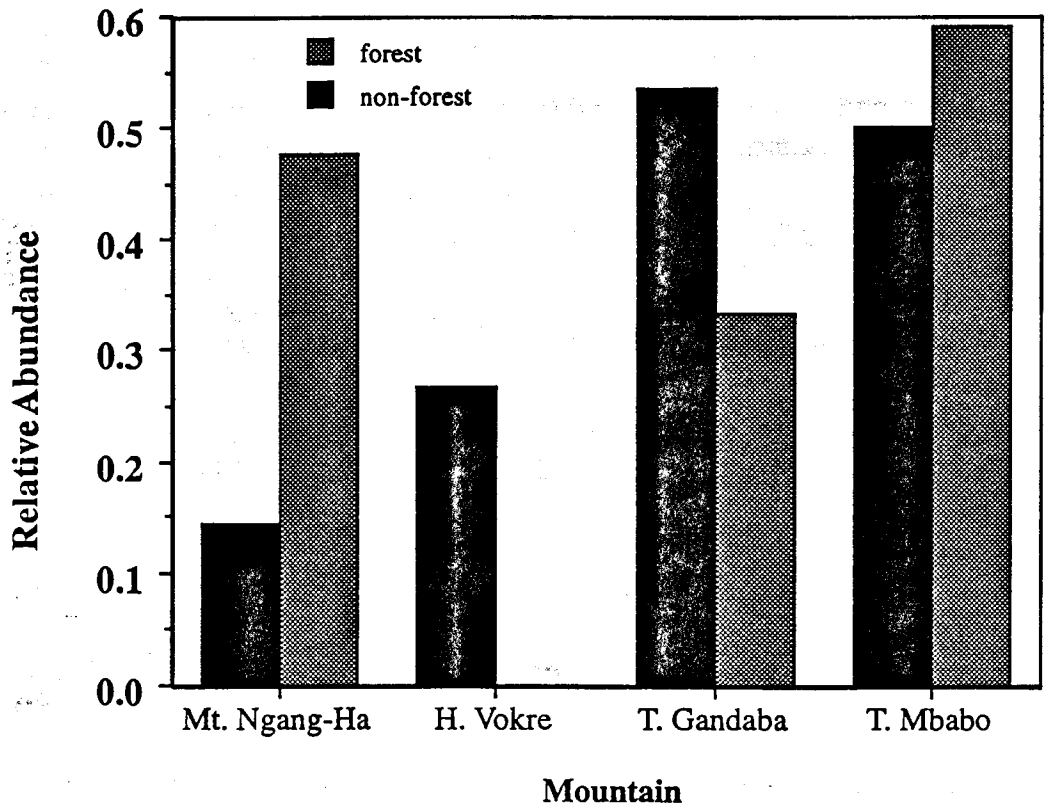

Figure 4. Relative abundance of forest and non-forest species on four montane sites. Relative abundance = the percentage of 100 m segments of transect on which sign was encountered for either group.

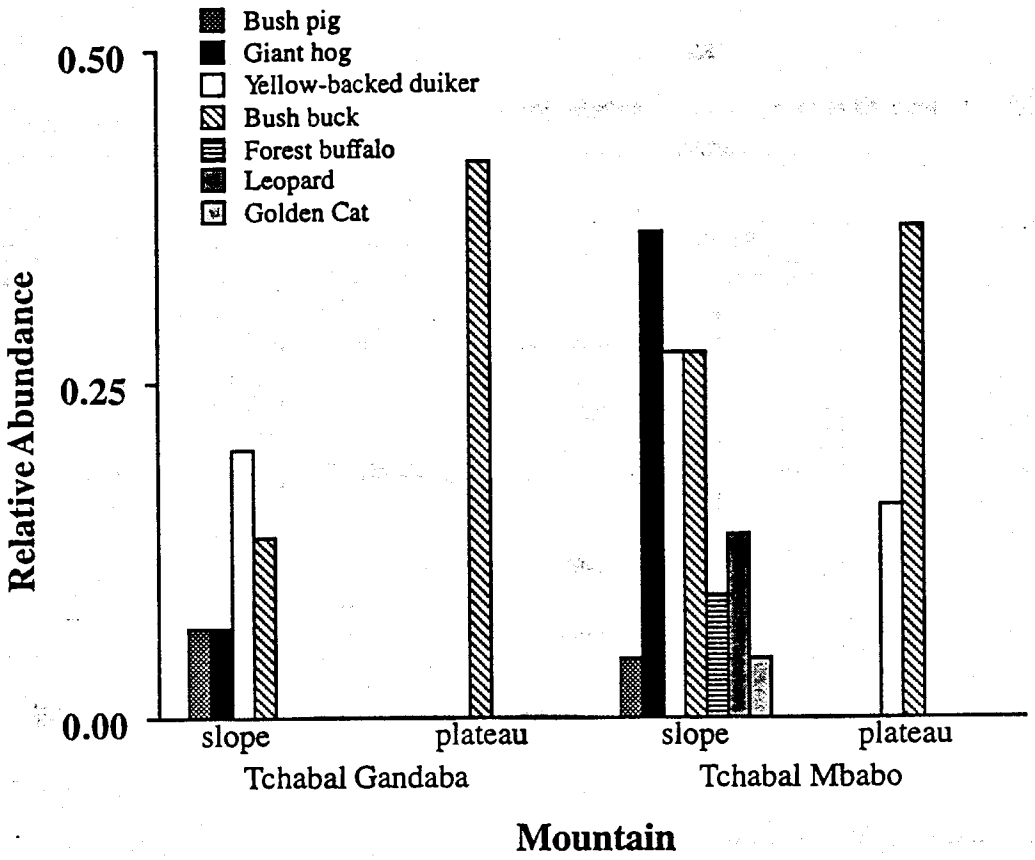

Figure 5. Comparison of species richness and relative abundance of forest requiring species on forest slopes and plateau forests on Tchabal Mbabo and Tchabal Gandaba. Relative abundance = number of 100 m segments for which sign was encountered for each species.

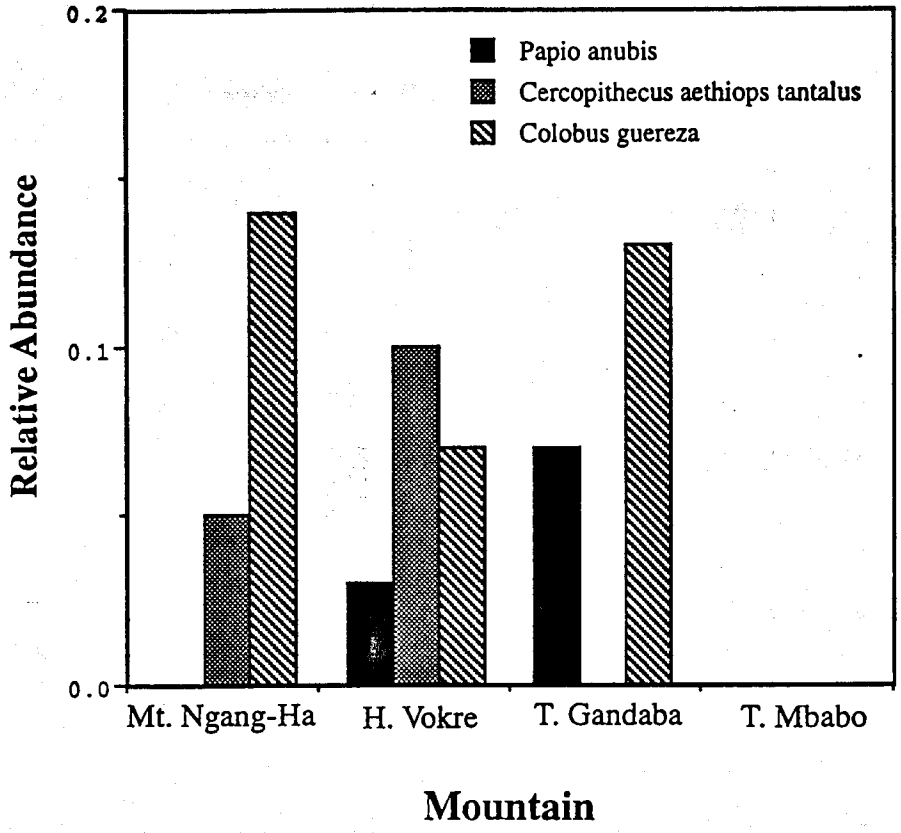

Figure 6. Relative abundance of primate species on the four montane sites. Relative abundance = the percentage of 100 m transects on which primates were sighted.

Birds

Tchabal Mbabo, being the highest elevation of the mountains surveyed, exceeded the other montane sites in the number of montane species (Figure 7) and abundance of montane species as reflected in the capture rates (Figure 8). Many of the lower elevation species present at the other montane sites are absent from this site. While Tchabal Mbabo is impressive for the number and abundance of montane species, Tchabal Gandaba is impressive for both its overall species richness and abundance with 132 species (Figure 7) and a capture rate of 47.12 per 1,000 m-hr Figure 8). We did not record such high species richness or capture rates, especially for montane birds for either Mt. Ngang-Ha or Hoséré Vokré. However, the survey of these mountains did result in substantial range extensions for the few montane species occurring there.

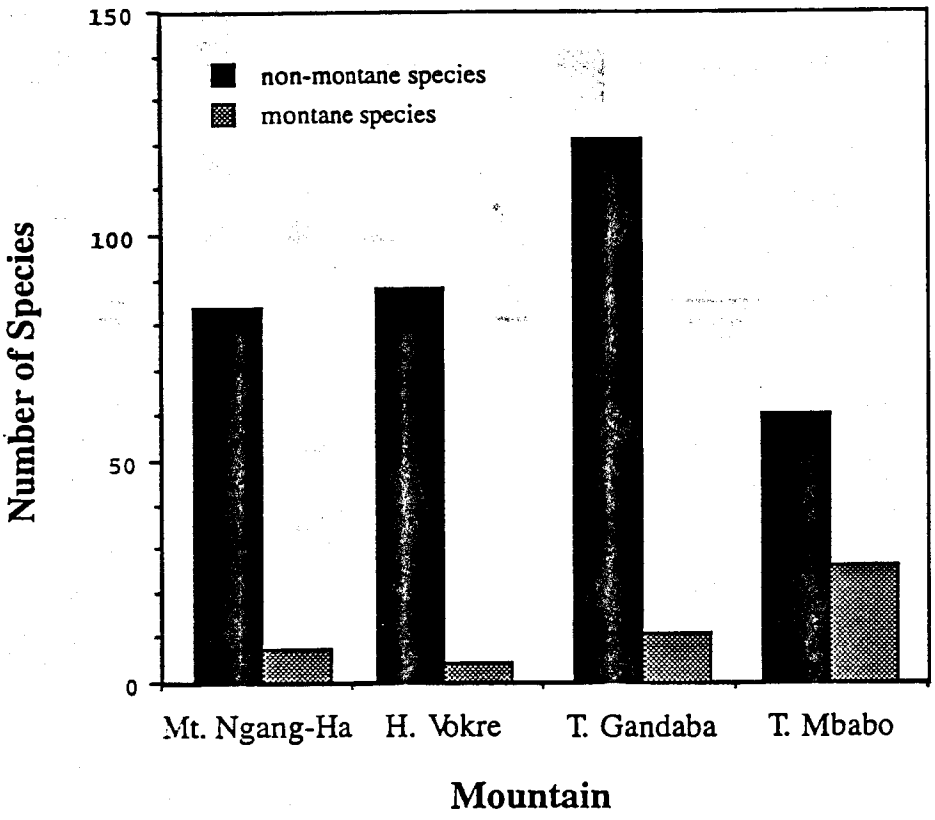

Figure 7. Number of bird species recorded from observations and mist-netting for the four montane sites.

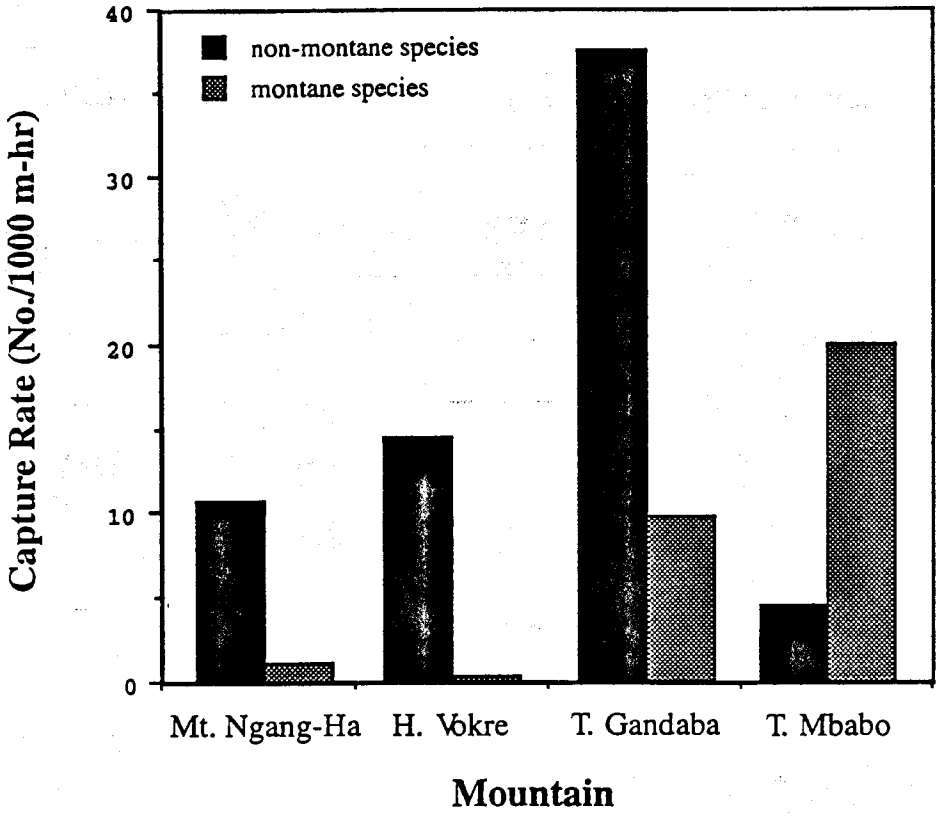

Figure 8. Capture rate for birds mist-netted in forest on the four montane sites. Capture rate = number of birds netted per 1000 m-hr.

Human Impacts And Recommendations For Conservation

Of the four montane sites surveyed, Tchabal Mbabo offers the most exiting opportunity for conservation montane forest. Besides harboring substantial tracts of healthy montane forest, high species diversity and abundance, the socio-political climate of the area seems to be favorable for such an undertaking (see above). The cultural climate on both Tchabal Gandaba and Mt. Ngang-Ha seem to favor conservation as well, although these areas are secondary to Tchabal Mbabo in their value for conserving montane forest. Only Hoséré Vokré had little to conserve, and would be an extremely difficult setting in which to attempt conservation. Table 15, below, summarizes the human aspects of each mountain site.

Table 15. Summary of human culture, attitudes and impacts, from interviews and observations.

Mountain	Tchabal Mbabo	Tchabal Gandaba	Mt. Ngang-Ha	Hoséré Vokré
Tribes	Yem-Yem mostly on plains & some on plateau Fulani on plateau, non-migratory	Pere in plains Fulani on plateau, non-migratory	Doayo in plains Mboum in plains Migratory Fulani on mountain	Doayo in plains Dupa on mountain Fulani on mountain, non-migratory
Religion	Muslim	Muslim Christian	Muslim Christian Indigenous	Indigenous Muslim

Villages Plains	Sambolabo, Galim, Dodeo, each at least 20 km from montane forests.	Sameleti and several others 12 km to west, Tignere 25 km to south, Mana 25 km to north.	Ngang-Ha and 15 other satellite villages under control of Ngang-Ha chief, north and west sides of mountain.	Poli, Mango, Boumba and others
Highlands	Mayo-Kelele and many scattered small settlements	Laoban in north, and many small scattered settlements	One encampment for migratory herders	Ninga and many others scattered over entire mountain
Approximate human population	Sambolabo - 1-2000 Plateau - 40 families in Mayo-Kelele one familly below mt to North cultivating corn	Sameleti -268 Plateau - 200 children in Laoban 500-1000 people on plateau	5000 in the 15 satellite villages No residents on mountain	1000 in Mango, Poli? Mountain - 75 in three villages comprising Ninga 1-2000 total? Many young people are moving off mountain to surrounding villages and Poli. Few young adults or children seen on mountain.
Access/roads	Nearest (5 km) goes through Mayo-Kelele to Nigeria Accessible only during dry season Roads difficult to Sambolabo	Nearest (15 km) ends just after Sameleti. Road to Sameleti impassable after rain Access from Mana to north end of plateau possible in dry season (Faro river)	Nearest (15 km) in good condition to Ngang-Ha Locals contribute funds for grading roads	Nearest (8 km) at Boumba in good condition to Poli, moderate to Mango.
Markets	Nearest in Mayo-Kelele Sambolabo, Banyo	Generally visited in a loop from Tignere to Gadjiwan to Plateau Used to be one in Sameleti but road too often washed out	In Ngang-Ha and 6 satellite villages, each a different day of the week	Poli (daily), Boumba

Primary schools	None on plateau Sambolabo Fulani children not sent	None on plateau In Sameleti, mission school with 2 teachers ~ 60 children - few pass government test to go on to high school Fulani don't send children	In Ngang-Ha and 6 satellite villages.	In Mango, Poli, one in Ninga under construction. Mission run.
Hospitals/ Clinics	None on plateau - no one comes to provide services - nearest services in Sambolabo and Galim	Tignere and Gadjiwan (dispensary) missionaries visit plateau yearly from Gadjiwan to provide vaccinations for children	Ngang-Ha and 4 clinics in satellite villages	Poli
Crops				
Subsistence	maize peanuts mango avocado	maize, potatoes, manioc, beans. bananas, greens, melon	manioc maize	millet, maize, taro, many var. of yams, beans, cocoayams, peanuts, other legumes, sorghum (underlined = grown on mountain)
Cash (production and prices)	Only in plains. In Sambolabo only by some who have access to tractor for large scale production	Maize in Sameleti yield: w/o fertilizer : 10 sacks/plot with fertilizer : 20 sack/plot maize: 8000 CFA/sack fertilizer: 8000 CFA/sack	Millet/yams yield: millet: 40-130 sacks/plot 1 sack = 11000 CFA yams: 10 plants = 2sacks 5-7000 CFA/sack	Some sell in mkts or sell to and exchange with other mountain villages Plains people produce more for sale.
Crop Rotation		Sameleti/maize w/o fert ilizer: 5 yrs on 10-12 off with fertilizer: 10 yrs on 10 off	12 yrs on/ 5 off	

Location and control of crops	@ villages in plains and on plateau Gallery forests being burned to plant corn on plateau - Fulani hire Nigerians from Tchamba or people from Banyo to plant and tend crops.	@ villages in plains and on plateau In Sameleti-plots assigned by chief	@ villages not on mountain Plots assigned by chief, how much you farm depends on how much you can clear	@ villages in plains and on mountain No control by chief choose your spot and clear it
Livestock				
Subsistence	Milk from cattle used in villages.	For labor, donkeys or horses (Laouban)	Goats, chickens	Goats, chickens
For Profit	Cattle - main livelihood for both people of Sambolabo and Fulani - sold in South	Cattle, sheep to market in Tignere Occasionally people come from Tignere to buy livestock cattle: 30-180,000 CFA sheep: 5-20,000 CFA	Migratory Fulani herders utilize mountain seasonally	Cattle-mostly used to buy wives (another w/ first child). Also killed for funerals. Burial in fetal position, wrapped in hides Doayo don't think much of Fulani practice of selling cows for meat, don't milk cows. Though Dupa take some to Poli for sale.
Location	Grazing on plateau by both Fulani and Yem Yem due to tsetse flies in plain	Plateau - Some migrate to plain during dry season	Mountain	Mountain and plains
Impacts	Burning in dry season (beginning and end) Overgrazing and erosion not as great here as T. Gandaba but hard edges of forest may indicate grazing impacts	Burning takes place only some years, grazing so heavy that little thatch left to burn. Burning occurs in plain more often to protect against accidental fires and to clear farms Extreme erosion and fouling of streams.	Yearly burning during dry season. Fire tends to extend into forest Lower impact than other sites due to seasonal nature of grazing, but marked impact on forest understory.	Burning in dry season Erosion in many areas.

Diseases	Many (Piel) 1st sign = hair on end tsetse not a problem on plateau	High tsetse density especially in plains, so no grazing there most of year.		Local tribes have different breed than Fulani (small, brown, no hump) supposedly more resistant to tsetse per local mission Plenty of diseases keep population down.
Veterinarians	One visit from Mayo Balaio or Tignere for yearly for vaccinations. Fulani pay for this suervice. Sometimes summoned to treat sick livestock.	Cattle inoculated by vets from Tignere and Ngaoundere. Also use pesticide spray	Vet in Nyassar	Vet in Poli for tsetse vaccinations etc. but difficult to take cattle down- never thought of having the vet come up mt. - may try.
Hunting				
Location	Mostly at villages in plain	Mostly at villages in plain	Mostly at villages in plain	Everywhere-sometimes long term expeditions off mountain to north
By Whom	Fulani do not hunt but people come from Bamenda and Dodeo Few hunters in Sambolabo	Some by Pere tribe, None by Fulani French hunting concession near Mana in north	Controlled by chief of Ngang-Ha Villagers Few outsiders concession was noted at 30 km	Dupa and Doayo
Species	Cane rat, porcupine, duiker	Cane rat, porcupine	buffalo, civet, bushpig, cane rat, duiker, porcupine NO PRIMATES	Everything, including primates
Time of Year		Mostly during dry season when animals move down slope during Fulani fires	Mostly dry season	Surrounding villages, mostly dry season On mountain all year, especially dry season
Methods	People from Bamenda and Dodeo hunt with guns, which causes some consternation among the Fulani due to noise disturbance of livestock	Bow and arrow, spear	Groups, bow and arrow, few guns, fire (for cane rat), dogs	Fire, bow and arrow, traps and snares

Profit or subsistence	Subsistence or sale	Subsistence	Subsistence	Subsistence, sale or exchange system baboon, bushbuck: 8000 CFA warthog, bushpig: 10,000 CFA also, in plain, for skin: crocodile: 1-4000 CFA python (6 m): 5000 CFA
Gathering	No wild fruits Firewood and building materials from forest	10-8 varieties of fruit Firewood and building materials	Rhonier palm eat fruits of wild & plant seeds to eat roots of young palms Medicinal (Maesa lanceolata, tea for stomach problems)	Firewood and building materials 6 varieties of wild fruits for subsistence or sale in Poli
Animal Pests	Livestock predators - lion, leopard, hyena, baboon (mostly sheep) Lion haven't been seen in this area for some years. Large village with many cattle (30-500 per family) may lose 10-20 per month (all ages) Baboons on crops	Baboon - villagers in Sameleti asked for means of destroying baboons Predators - livestock	Baboons, patas Farmers use dogs to keep them at bay	Everything is considered a pest, especially baboons Villagers asked for poison or other devices to kill all baboons
Attitudes toward conservation	Yem Yem like idea of conservation Fulani - somewhat positive, but concerned about predators.	Pere- no opinion. Mountain impacts them little. Fulani- Sees potential problems with conservation in terms of limiting grazing rights and increase of predators	Open to conservation see disappearance of wild animals as negative, see Fulani grazing & burning of mountain as problem, see mountain as sacred, tend to report unauthorized hunts	No animals are worth conserving, all animals damage crops. Even the animals they hunt for meat aren't worth conserving because value of meat does not offset damage to crops. Suspicious of other local tribes and all outsiders.

LOWLAND FOREST SITE

NKI (East of Ngoïla)

The lowland forest site is located in southeast Cameroon (30 km) east of Ngoïla, at the northwest corner of the proposed Nki reserve (Figure 2e). It lies across the Dja River from Ngoïla. This is a region of extensive primary forest. The area is hilly with numerous drainage systems.

Vegetation

The vegetation of the site is mixed evergreen and semi-deciduous open canopy forest. The forest in this area has not been logged. The undergrowth varies, with areas of herbaceous undergrowth interspersed with more dense shrubby undergrowth. Gorilla activity seems to be concentrated in the areas of dense undergrowth. A small percentage of the area is *Raphia*/swamp forest.

Vertebrate Species Richness And Relative Abundance

Mammals

Two 2.5 km transects were cut east of Ngoïla, totaling 5 km (Fig. 2e). Each transect was walked twice for the purpose of sighting animals after the initial cutting and looking for sign.

The area east of Ngoïla is high in mammal species richness, especially primates, and appears to support sizable populations of gorilla (*Gorilla gorilla*) and elephant (*Loxodonta africana*), two species listed as "Vulnerable" by IUCN (Groombridge 1994). Also present but less abundant in the area are two other "Vulnerable" primate species, chimpanzee (*Pan troglodytes*) and black colobus (*Colobus satanas*), and bongo (*Boocercus euryceros*).

Elephant sign was present on nearly half of all transect segments (0.42, Table 16), frequently associated with either marsh or stream course. They were never seen, but they were heard once in the vicinity of a transect, as were chimpanzee. Gorilla sign was encountered on 18% of transect segments, and an adult male was also seen feeding.

Table 16. Mammals occurring or likely to occur east of Ngoïla. Occurrence is A = species which were directly observed, B = species for which sign was observed, C = species deemed likely to occur based on interviews with locals. Frequencies of mammal sign and sighting were determined from presence/absence data for 100 m segments of transect.

Species	Vernacular name	Occur.	Sign frequency	Sighting frequency
Manis sp.	Pangolin	B	0.05	—
Loxodonta africana	Elephant	B	0.42	—
Gorilla gorilla	Gorilla	A	0.18	—
Pan troglodytes	Chimpanzee	B	0.04	—
Cercocebus galeritus	Crested mangabey	A	—	0.01
Cercocebus albigena	Grey-cheeked mangabey	A	—	0.05
Cercopithecus nictitans	White-nosed guenon	A	—	0.07
Cercopithecus pogonius	Crowned guenon	A	—	0.06
Cercopithecus cephus	Moustached monkey	A	—	0.02
Colobus satanas	Black colobus	A	—	0.01
Colobus guereza	Black and white colobus	A	—	0.01
Boocercus euryceros	Bongo	B	—	—
Potamochoerus porcus porcus	Western bush-pig	B	0.04	—
Tragelaphus spekei	Sitatunga	A	—	—
Cephalophus silvicultor	Yellow-backed duiker	A	0.12	0.01
Cephalophus dorsalis/callipygus	Bay / Peter's duiker	B	0.18	—
Cephalophus monticola	Blue duiker	B	0.08	—

Human Impacts And Recommendations For Conservation

The human impact in the immediate vicinity of our survey site is limited. The nearest village, Ngoïla, is 30 km distant across the Dja River. There has been no logging in the area, and though trails have been cut to the site in the past for hunting purposes they appear to be infrequently used. Locals seem to subsist primarily on agriculture, with cacao as a cash crop. Plantations are common between Ngoïla and the Dja River (about 15 miles east of Ngoïla) but none occur east of the river. Fishing is very common along the river, and nets were observed in the river on all four days we were near the river, the river being an over night stopping point on the walk in and out.

The people of Ngoïla profess to be infrequent hunters, relying more on agriculture for cash and subsistence. Local Baka engage in frequent hunting activities, as must other local tribes. While the area near our survey site is not hunted often, the area nearer Ngoïla probably is, as there was a great deal of bush meat coming out of the area by bush taxi. During both of our overnight stays at a hut near the Dja belonging to the family of our local hunter, family members returned with bush meat, including blue duiker, white-nosed guenon, bay or Peter's duiker, and a moustached monkey. Our guides and other locals, including Baka, lead an annual hunting trip for a German group to hunt elephant and duiker, but they apparently go 50 km south of Ngoïla, closer to Congo.

The conservation value of Nki, given the high apparent densities of elephant and gorilla found there, is likely on a par with the other proposed reserves surveyed by Stromayer and Ekobo (1991) and similar to them in terms of human impacts. Like the proposed Boumba-Bek reserve, and unlike Lake Lobeke and Mongokele, the area is virgin forest, and the impacts of logging towns and access roads closer than 30 km are absent. Because of these attributes we feel that the Nki region has high potential as a conservation area, and should be investigated in greater detail.

ECOTONE SITES

BÉTARÉ OYA

This site is intermediate between forest and forest/savanna ecotone. Large patches of forest are present that are not necessarily associated with rivers. The area where nets were placed is adjacent to a small stream approximately 5 km southwest of Bétaré Oya, and is somewhat fragmented due to past burning. The vegetation fits that described by Letouzey (1968) as Shrub-savanna with *Terminala glaucecens* and by Louette (1981) as forest-savanna mosaic.

Avian Species Richness And Relative Abundance

The 84 avian species recorded here include savanna species and gallery forest specialists, as well as many species typical of lowland forest (Table 17). For example, *Nectarinia verticalis* co-occurs with the forest species *N. olivacea*. Larger forest birds also occur here, such as the blue plantain eater (*Corythaeola cristata*) and the black casqued and African pied hornbills (*Ceratogymna atrata and Tockus fasciatus*). *Pogoniulus scolopaceus*, *Bleda syndactyla*, *Bleda exima*, and *Eremomela badiceps* are described by Louette (1981) as having distributions restricted to high forest. *Malacocincla puveli* is of interest as a species which is restricted to this contact zone between forest and savanna.

Cossypha natalensis a species found primarily in eastern and southern Africa was recorded here both in 1989 (Smith unpubl.) and 1995 the only record previous to 1989 was from Yaoundé in 1953 (Louette 1981).

Table 17. Birds mist-netted and/or observed at Bétaré Oya, Cameroon, 5-8 May, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Mist-netted birds were caught in forest. Species followed by asterisks are typically restricted to forest or high forest according to [Louette, 1981 #5]. Capture rate is number of individuals caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Polyboroides radiatus	African harrier hawk	S	2	—
Buteo auguralis	Red-necked buzzard	S	2	—
Lophaetus occipitalis	Long-crested hawk-eagle	S	1	—
Aquila rapax	Tawny eagle	S	1	—
Milvus migrans	Black-kite	S	2	—
Macheirhamphus alcinus	Bat hawk	S	1	—
Francolinus bicalcaratus	Double-spurred francolin	S	1	—
Francolinus squamatus	Scaly francolin	F	1	—
Tauraco persa	Green touraco	F	1	—
Crinifer piscator	Western grey plantain-eater	S	1	—
Corythaeola cristata	Blue plantain-eater	F	1	—
Chrysococcyx cupreus	Emerald cuckoo	F	1	—
Ceuthmochares aereus	Yellowbill coucal	F	1	0.32
Centropus senegalensis	Senegal coucal	S	2	—
Caprimulgus sp.	Nightjar	S	1	—
Apus barbatus	African black swift	S	1	—
Apus affinis	Little swift	S	3	—
Cypsiurus parvus	African palm Swift	S	3	—
Colius striatus	Speckled mousebird	S	3	—
Ceryle maxima	Giant kingfisher	S	1	—
Halcyon senegalensis	Woodland kingfisher	S	3	—
Merops albicollis	White-throated bee-eater	S	3	—
Tockus nasutus	Grey hornbill	S	1	—
Tockus fasciatus	African pied hornbill	F	2	—
Ceratogymna atrata	Black-casqued hornbill	F	1	—
Gymnobucco bonapartei	Grey-throated barbet	F	3	0.32
*Pogoniulus scolopaceus***	Speckled tinkerbird	F	1	—
Verreauxia africana	African piculet	—	—	0.32
Campethera caroli	Brown-eared woodpecker	—	—	0.32
Smithornis capensis	African broadbill	F	2	1.27
Hirundo senegalensis	Mosque swallow	S	3	—
Hirundo abyssinica	Lesser striped swallow	S	2	—
Hirundo spilodera	Preus's cliff swallow	S	1	—
Psalidoprocne petiti	Petit's roughwing	S	1	0.32
Motacilla vidua	African pied wagtail	S	1	—
Pycnonotus barbatus	Common bulbul	F	3	—
Andropadus curvirostris	Cameroon somber greenbul	—	—	0.32
Andropadus virens	Little greenbul	F	3	6.99
*Chlorocichla falkensteini***	Yellow-necked greenbul	F	3	—
Thescelocichla leucopleurus	Swamp-palm bulbul	F	1	0.32
Phyllastrephus albigularis	White-throated greenbul	—	—	1.27
Phyllastrephus sp.	Undescribed Greenbul	—	—	0.64
*Bleda syndactyla***	Bristlebill	—	—	0.32
*Bleda exima***	Green-tailed bristlebill	—	—	0.64

*Nicator chloris***	Nicator	F	1	—
*Nicator vireo***	Yellow-throated nicator	—	—	0.32
*Dryoscopis senegalensis***	Zanzibar puffback	S	1	—
Tchagra australis	Brown-headed tchagra	—	—	0.32
Laniarius ferrugineus	Tropical boubou	S	3	—
Myrmecocichla nigra	Sooty chat	S	1	—
*Alethe diademata***	Fire-crested alethe	—	—	1.27
Cossypha polioptera	Grey-winged robin-chat	—	—	0.32
Cossypha natalensis	Red-capped robin-chat	F	2	0.95
Turdus pelios	African thrush	F	3	—
Malacocincla fulvescens	Brown iliadopsis	—	—	0.64
Malacocincla puveli	Puvel's iliadopsis	—	—	0.64
Sphenoeacus mentalis	Moustached scrub-warbler	S	1	—
Camaroptera brachyura	Grey-backed camaroptera	F	3	1.91
*Eremomela badiceps***	Brown-crowned eremomela	S	1	—
*Sylvietta virens***	Green crombec	—	—	0.32
*Macrosphenus concolor***	Olive longbill	—	—	0.32
Hylia prasina	Green hylia	—	—	0.64
Bias musicus	Black and White flycatcher	F	1	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	—
*Platysteira castanea***	Chestnut wattle-eye	F	1	0.64
*Platysteira blissetti***	Red-cheeked wattle-eye	—	—	0.95
*Trochocercus nitens***	Black-headed crested flycatcher	—	—	0.32
*Terpsiphone rufiventor***	Red-bellied paradise flycatcher	—	—	0.95
Terpsiphone viridis	Paradise flycatcher	F	3	—
Anthreptes collaris	Collared sunbird	F	3	0.32
Nectarinia olivacea	Olive sunbird	F	3	1.91
Nectarinia verticalis	Green-headed sunbird	F	3	0.64
Nectarinia chloropygia	Olive-bellied sunbird	—	—	1.27
Nectarinia cuprea	Copper sunbird	S	1	—
Pirenestes ostrinus	Black-bellied seedcracker	—	—	0.64
*Spermophaga haematina***	Bluebill	—	—	0.95
Estrilda nonnula	Black-crowned waxbill	F	3	—
Ploceus cucullatus	Village weaver	F	3	—
Ploceus superciliosus	Compact weaver	S	1	—
*Ploceuas bicolor***	Dark-backed weaver	—	—	0.32
Oriolus nigripennis	Black-winged oriole	F	1	—
Dicrurus atripennis	Shining drongo	—	—	0.32
Corvus albus	Pied crow	S	3	—
Total species = 84	Individuals netted/1,000 m-hr = 30.25			

MEIGANGA

Located on the Adamawa Plateau, this region is characterized by savanna with gallery forests (Louette 1981). The vegetation is described as Sudan-Guinean savanna with *Daniellia* and *Lophira* (Letouzey 1968). Nets were placed in a small gallery forest 10 km south of Meiganga along the Yoyo River. This was a small forest, no larger than 100 m across. We noted signs of recent clearing of gallery forests in the area.

Avian Species Richness and Relative Abundance

Avian species richness and relative abundance was similar as those for most other ecotone sites, with 95 species recorded, and a capture rate of 30.96 birds netted per 1,000 m-hr (Table 18).

Table 18. Birds mist-netted and/or observed at Meiganga, Cameroon, 9-13 May, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. All mist-netted birds were caught in forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Nycticorax nycticorax	Black-crowned night heron	S	1	—
Ardeola ibis	Cattle egret	S	3	—
Scopus umbretta	Hammerkop	S/F	1	—
Neophron monachus	Hooded vulture	S	2	—
Polyboroides radiatus	African harrier hawk	S	2	—
Buteo auguralis	Red-necked buzzard	S	2	—
Milvus migrans	Black-kite	S	3	—
Macheirhamphus alcinus	Bat hawk	S	1	—
Francolinus bicalcaratus	Double-spurred francolin	S	1	—
Francolinus squamatus	Scaly francolin	F	1	—
Streptopelia semitorquata	Red-eyed dove	S/F	3	—
Turtur afer	Red-billed wood dove	S/F	3	—
Treron australis	African green pigeon	S/F	2	—
Agapornis pullaria	Red-headed lovebird	S/F	2	—
Tauraco leucolophus	White-crested touraco	F	3	—
Musophaga rossae	Lady Ross's touraco	F	2	—
Cuculus solitarius	Red-chested cuckoo	F	2	—
Chrysococcyx klaas	Klaa's cuckoo	S	2	—
Bubo africanus	Spotted Eagle-owl	F	1	—
Apus affinis	Little swift	S	3	—
Cypsiurus parvus	African palm Swift	S	3	—
Colius striatus	Speckled mousebird	S/F	3	—
Ceyx picta	African pigmy kingfisher	F	3	1.02
Halcyon malimbica	Blue-breasted kingfisher	F	3	0.25
Merops albicollis	White-throated bee-eater	S	1	
Merops bulocki	Red-throated bee-eater	S/F	3	1.02
Tockus nasutus	Grey hornbill	S	1	
Lybius bidentatus	Tooth-billed barbet	F	2	0.25
Pogoniulus bilineatus	Lemon-rumped tinkerbird	S	2	—
Dendropicos fuscescens	Cardinal woodpecker	S	1	—
Mesopicos goertae	Grey woodpecker	S	2	—
Hirundo senegalensis	Mosque swallow	S	2	—
Hirundo spilodera	Preuss's cliff swallow	F	1	
Psalidoprocne petiti	Petit's roughwing	S/F	3	0.76
Motacilla vidua	African pied wagtail	S	1	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S	2	—
Pycnonotus barbatus	Common bulbul	S/F	3	0.51
Andropadus virens	Little greenbul	F	2	2.54
Chlorocichla flavicollis	Yellow-throated Leaf-love	F	3	0.51
Tchagra minuta	Black-cap tchagra	—	—	0.51
Laniarius ferrugineus	Tropical boubou	S/F	3	—
Malaconotus sulfureopectus	Sulphur-breasted bush-shrike	S	1	0.25
Cossypha polioptera	Grey-winged robin-chat	F	2	1.52
Cossypha niveicapilla	Snowy-headed robin-chat	F	3	1.27
Turdus pelios	African thrush	F	3	0.76

Ptyrticus turdinus	Thrush babbler	F	1	0.51
Turdoides reinwardii	Black-cap babbler	F	3	—
Sphenoeacus mentalis	Moustached scrub-warbler	S/F	1	—
Hippolais pallida	Olivaceus warbler	F	1	—
Sylvia borin	Garden warbler	—	—	0.25
Cisticola erythrops	Red-faced cisticola	S	3	1.52
Cisticola lateralis	Whistling cisticola	S	3	0.51
Prinia subflava	Tawny-flanked prinia	S	2	—
Prinia leucopogon	White-chinned prinia	F	3	4.32
Drymocichla incana	Red-winged grey warbler	F	2	—
Hypergerus atriceps	Oriole warbler	F	3	0.25
Camaroptera brachyura	Grey-backed camaroptera	F/S	3	0.76
*Muscicapa adusta***	Dusky flycatcher	S	2	—
Myioparus plumbeus	Grey-tit flycatcher	S	1	—
Melaenornis edolioides	Black flycatcher	S	2	—
Hyliota flavigaster	Yellow-bellied flycatcher	S	1	—
Batis sp.	Puffback	S	1	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	—
Platysteira castanea	Chestnut wattle-eye	—	—	0.25
Trochocercus longicauda	Blue fairy flycatcher	S/F	3	0.76
Nectarinia verticalis	Green-headed sunbird	F/S	3	2.54
Nectarinia preussi	**Preuss's sunbird**	F	3	0.76
Nectarinia cuprea	Copper sunbird	S	3	0.25
Nectarinia coccinigaster	Splendid sunbird	S	2	—
Zosterops senegalensis	Yellow white-eye	S	1	0.51
Emberiza cabanisi	Cabani's bunting	S	1	—
Serinus mozambicus	Yellow-fronted canary	S	2	—
Clytospiza monteiri	Brown twinspot	F/S	2	0.51
Clytospiza dybowskii	Dybowski's twinspot	S/F	2	—
Pirenestes ostrinus	Black-bellied seedcracker	F	1	1.02
Nesocharis capistrata	Grey-headed olive-back	S	1	0.76
Estrilda melipoda	Orange-cheeked waxbill	S	3	—
Estrilda nonnula	Black-crowned waxbill	F/S	3	0.51
Estrilda astrild	Common waxbill	S	3	0.76
Estrilda bengala	Red-cheeked cordon-bleu	S	2	—
Lagonosticta rufopicta	Bar-breasted fire-finch	S	2	0.76
Lagonosticta rubricata	African fire-finch	S/F	2	—
Ploceus baglafecht	Baglafecht's weaver	F	1	—
Ploceus cucullatus	Village weaver	S/F	3	—
Ploceus superciliosus	Compact weaver	F	1	0.25
Ploceus ocularis	Spectacled weaver	F	2	1.52
Euplectes macrourus	Yellow-mantled whydah	S	3	—
Passer griseus	Grey-headed sparrow	S	3	—
Grafisia torquata	White-collared starling	F	2	—
Lamprotornis splendidus	Splendid glossy starling	F	1	—
Cinnyricinclus leucogaster	Amethyst starling	F	2	—
Oriolus auratus	African golden oriole	S	1	—
Dicrurus ludwigii	Square-tailed drongo	—	—	0.51
Ptilostomus afer	Piapiac	S	1	—
Corvus albus	Pied crow	S	3	—

Total species = 95 Individuals netted/1,000 m-hr = 30.96

DJOHONG

Located on the eastern part of the Adamawa Plateau, this area, like Meiganga, is comprised of savanna with gallery forest (Letouzey 1968, Louette 1981). Nets were placed along a narrow (25-100 m wide) but long gallery forest, 5 km west of Djohong.

Avian Species Richness and Relative Abundance

Eighty-seven species of birds were recorded at this site, and the capture rate was 31.34 per 1,000 m-hr, in keeping with most of the other ecotone sites (Table 19).

Table 19. Birds mist-netted and/or observed at Djohong, Cameroon, 14-17 May, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. All mist-netted birds were caught in forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Neophron monachus	Hooded vulture	S	2	—
Kaupifalco monogrammicus	Lizard buzzard	F	1	—
Polemaetus bellicosus	Martial eagle	S	1	—
Milvus migrans	Black-kite	S	2	—
Elanus caeruleus	Black-shouldered Kite	S	2	—
Limnocorax flavirostra	Black crake	F	1	—
Vanellus senegallus	African wattled lapwing	S	1	—
Streptopelia semitorquata	Red-eyed dove	S	2	—
Turtur afer	Red-billed wood dove	F	2	0.25
Treron australis	African green pigeon	F	2	—
Agapornis pullaria	Red-headed lovebird	S	3	—
Tauraco leucolophus	White-crested touraco	F	2	—
Musophaga rossae	Lady Ross's touraco	F	2	—
Centropus senegalensis	Senegal coucal	—	—	0.25
Apus melba	Alpine swift	S	2	—
Apus aequatorialis	Mottled swift	S	2	—
Apus barbatus	African black swift	S	3	—
Apus caffer	White-rumped swift	S	2	—
Apus affinis	Little swift	S	3	—
Cypsiurus parvus	African palm Swift	S	3	—
Colius striatus	Speckled mousebird	S	3	0.25
Ceyx picta	African pigmy kingfisher	F	3	3.23
Halcyon senegalensis	Woodland kingfisher	S	2	—
Halcyon malimbica	Blue-breasted kingfisher	F	3	1
Tockus nasutus	Grey hornbill	S	2	—
Lybius bidentatus	Tooth-billed barbet	F	2	—
Pogoniulus bilineatus	Lemon-rumped tinkerbird	S	3	0.25
Indicator indicator	Greater honeyguide	—	—	0.25
Dendropicos fuscescens	Cardinal woodpecker	S	2	—
Mesopicos goertae	Grey woodpecker	S	2	—
Hirundo senegalensis	Mosque swallow	S	3	—
Delichon urbica	House martin	S	1	—
Psalidoprocne petiti	Petit's roughwing	F	3	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S	1	—
Pycnonotus barbatus	Common bulbul	F	3	—
Andropadus virens	Little greenbul	F	1	0.75

Chlorocichla flavicollis	Yellow-throated Leaf-love	F	3	1.74
Prionops plumata	Straight-crested helmet-shrike	S	1	—
Tchagra senegala	Black-headed tchagra	S	1	—
Laniarius ferrugineus	Tropical boubou	S/F	3	—
Corvinella corvina	Yellow-billed shrike	S	1	—
Cossypha polioptera	Grey-winged robin-chat	F	1	1
Cossypha niveicapilla	Snowy-headed robin-chat	S/F	3	1.49
Turdus pelios	African thrush	S/F	3	0.75
Turdoides reinwardii	Black-cap babbler	F	3	1
Sphenoeacus mentalis	Moustached scrub-warbler	F	1	—
Sylvia borin	Garden warbler	—	—	0.25
Cisticola erythrops	Red-faced cisticola	—	—	0.25
Cisticola lateralis	Whistling cisticola	S	3	0.5
Prinia subflava	Tawny-flanked prinia	S	3	—
Prinia leucopogon	White-chinned prinia	F	3	1.99
Apalis flavida	Yellow-chested apalis	F	1	—
Drymocichla incana	Red-winged grey warbler	F	1	1.24
Hypergerus atriceps	Oriole warbler	F	2	0.5
Camaroptera brachyura	Grey-backed camaroptera	S/F	3	—
Melaenornis edolioides	Black flycatcher	S	2	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	2	1.24
Trochocercus longicauda	Blue fairy flycatcher	F	3	0.75
Terpsiphone viridis	Paradise flycatcher	S/F	3	—
Nectarinia verticalis	Green-headed sunbird	S/F	3	4.98
Nectarinia senegalensis	Scarlet-chested sunbird	S	1	—
Nectarinia preussi	**Preuss's sunbird**	F	2	3.23
Nectarinia cuprea	Copper sunbird	S/F	3	0.25
Nectarinia coccinigaster	Splendid sunbird	S	2	0.75
Zosterops senegalensis	Yellow white-eye	S	2	—
Serinus mozambicus	Yellow-fronted canary	S	2	—
Clytospiza monteiri	Brown twinspot	S/F	2	0.5
Clytospiza dybowskii	Dybowski's twinspot	S/F	2	0.25
Pirenestes ostrinus	Black-bellied seedcracker	F	1	0.25
Pytelia hypogrammica	Yellow-winged pytilia	F	1	—
Estrilda melipoda	Orange-cheeked waxbill	S/F	3	—
Estrilda nonnula	Black-crowned waxbill	S/F	3	0.5
Estrilda astrild	Common waxbill	S/F	3	—
Lagonosticta rubricata	African fire-finch	S/F	2	0.25
Ploceus baglafecht	Baglafecht's weaver	F	1	0.25
Ploceus cucullatus	Village weaver	S/F	3	—
Ploceus superciliosus	Compact weaver	S	1	—
Ploceus ocularis	Spectacled weaver	S/F	2	0.75
Ploceus nigricollis	Black-necked weaver	S/F	2	—
Euplectes macrourus	Yellow-mantled whydah	S	2	—
Passer griseus	Grey-headed sparrow	S	3	—
Grafisia torquata	White-collared starling	F	2	—
Cinnyricinclus leucogaster	Amethyst starling	F	2	—
Oriolus auratus	African golden oriole	F	1	—
Dicrurus ludwigii	Square-tailed drongo	—	—	0.5
Dicrurus adsimilis	Drongo	S	1	—
Corvus albus	Pied crow	S	3	—

Total species = 87 Individuals netted/1,000 m-hr = 31.34

NGAOUNDABA RANCH

This site is also located on the Adamawa Plateau and characterized by savanna and gallery forest similar to the preceding sites. It is only 20 km from another site, Wakwa, and was established in order to examine micro geographic differences among species. Nearby is a crater lake which attracts large numbers of birds which roost around the perimeter. Nets were set up in a pair of gallery forests 2 km east of the lake.

Avian Species Richness and Relative Abundance

Due in part to the presence of the crater lake, we recorded a greater number of species at Ngaoundaba Ranch than for any of the other ecotone sites (Table 20). Several of the 129 species included water birds attracted to the lake. Cattle egret, great egrets and the blue-eared glossy starling were attracted to the lake in huge flocks to roost.

Although the number of species recorded in the area was high, the overall capture rate was lowest of all the ecotone sites, with only 13.10 birds caught per 1,000 m-hr.

Table 20. Birds mist-netted and/or observed at Ngaoundaba Ranch, Cameroon, 19-23 May, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. All mist-netted birds were caught in forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Phalacrocorax africanus	Reed cormorant	L	3	—
Ardeola ibis	Cattle egret	L	3	—
Egretta alba	Great egret	L	2	—
Ardea purpurea	Purple heron	L	1	—
Scopus umbretta	Hammerkop	L,S	1	—
Ciconia abdimii	Abdim's stork	S	1	—
Bostrychia hagedash	Hadada ibis	L,S	3	—
Gyps rüpellii	Rüppells griffon	S	1	—
Gyps bengalensis	African white-backed vulture	S	2	—
Neophron monachus	Hooded vulture	S	2	—
Circus aeruginosus	Marsh Harrier	S	1	—
Polyboroides radiatus	African harrier hawk	S	1	—
Accipiter badius	Shikra	S	1	—
Buteo auguralis	Red-necked buzzard	S	2	—
Lophaetus occipitalis	Long-crested hawk-eagle	S	1	—
Milvus migrans	Black-kite	S	1	—
Elanus caeruleus	Black-shouldered Kite	S	2	—
Francolinus bicalcaratus	Double-spurred francolin	S	3	—
Francolinus squamatus	Scaly francolin	—	—	0.1
Numida meleagris	Helmeted guineafowl	S	1	—
Crex egregia	African crake	S/F	1	—
Actophilornis africana	African jacana	L	2	—
Vanellus spinosus	Spur-winged plover	L	1	—
Vanellus senegallus	African wattled lapwing	S,L	2	—
Streptopelia semitorquata	Red-eyed dove	S	3	—
Streptopelia vinacea	Vinaceous dove	S	3	—
Turtur tympanistria	Tambourine dove	—	—	0.1

Turtur afer	Red-billed wood dove	—	—	0.1
Treron australis	African green pigeon	S	3	—
Agapornis pullaria	Red-headed lovebird	S	1	—
Tauraco leucolophus	White-crested touraco	F	2	—
Musophaga rossae	Lady Ross's touraco	F	2	—
Crinifer piscator	Western grey plantain-eater	S	3	—
Cuculus solitarius	Red-chested cuckoo	F	3	—
Chrysococcyx klaas	Klaa's cuckoo	S	1	—
Centropus senegalensis	Senegal coucal	S/F	3	—
Apus barbatus	African black swift	S	1	—
Apus caffer	White-rumped swift	S	1	—
Apus affinis	Little swift	S	1	—
Cypsiurus parvus	African palm Swift	S	3	—
Colius striatus	Speckled mousebird	S/F	3	0.1
Ceryle maxima	Giant kingfisher	L	1	—
Ceryle rudis	Pied kingfisher	L	1	—
Alcedo cristata	Malachite kingfisher	L	1	—
Ceyx picta	African pigmy kingfisher	—	—	1.03
Halcyon senegalensis	Woodland kingfisher	S	1	—
Halcyon malimbica	Blue-breasted kingfisher	F	1	0.41
Halcyon chelicuti	Striped kingfisher	S	1	—
Merops bulocki	Red-throated bee-eater	S/F	1	—
Eurystomus glaucurus	Broad-billed roller	S	1	—
Phoeniculus purpureus	Green wood-hoopoe	S	1	—
Tockus nasutus	Grey hornbill	S	1	—
Lybius bidentatus	Tooth-billed barbet	F	1	0.21
Lybius vieilloti	Vieillot's barbet	S	1	—
Pogoniulus chrysoconus	Yellow-fronted tinkerbird	S	1	—
Pogoniulus bilineatus	Lemon-rumped tinkerbird	F	1	0.31
Indicator willcocksi	Willcock's honeyguide	—	—	0.1
Campethera caillianti	Green-backed woodpecker	—	—	0.1
Mesopicos goertae	Grey woodpecker	S	1	—
Smithornis capensis	African broadbill	—	—	0.1
Galerida modesta	Sun lark	S	1	—
Riparia cincta	Banded martin	S,L	3	—
Hirundo senegalensis	Mosque swallow	S	3	—
Delichon urbica	House martin	S	1	—
Psalidoprocne petiti	Petit's roughwing	S	3	—
Macronyx croceus	Yellow-throated longclaw	S	1	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S	2	0.1
Pycnonotus barbatus	Common bulbul	F	3	—
Andropadus virens	Little greenbul	F	—	0.72
Chlorocichla flavicollis	Yellow-throated Leaf-love	F	3	0.41
Phyllastrephus scandens	Leaf-love	—	—	0.21
Prionops plumata	Straight-crested helmet-shrike	S	2	—
Tchagra minuta	Black-cap tchagra	F	1	—
Laniarius ferrugineus	Tropical boubou	F/S	3	0.1
Malaconotus sulfureopectus	Sulphur-breasted bush-shrike	S	1	0.21
Corvinella corvina	Yellow-billed shrike	S	3	—
Cossypha polioptera	Grey-winged robin-chat	—	—	0.72
Cossypha albicapilla	White-crowned robin-chat	F	1	0.72
Cossypha niveicapilla	Snowy-headed robin-chat	F	1	0.31
Turdus pelios	African thrush	F	3	—
Turdoides plebejus	Brown babbler	S	1	—

Turdoides reinwardii	Black-cap babbler	F	1	—
Schoenicola platyura	Fan-tailed swamp warbler	S/F	1	—
Cisticola erythrops	Red-faced cisticola	—	—	0.21
Cisticola lateralis	Whistling cisticola	S	1	0.21
Cisticola galactotes	Winding cisticola	?	?	—
Prinia subflava	Tawny-flanked prinia	?	?	—
Prinia leucopogon	White-chinned prinia	F	1	0.41
Drymocichla incana	Red-winged grey warbler	S	1	—
Hypergerus atriceps	Oriole warbler	F	1	0.31
Camaroptera brachyura	Grey-backed camaroptera	F	1	0.93
Muscicapa adusta	**Dusky flycatcher**	S	3	—
Myioparus plumbeus	Grey-tit flycatcher	—	—	0.1
Melaenornis edolioides	Black flycatcher	S	1	—
Bradornis pallidus	Pale flycatcher	S	1	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	1.03
Trochocercus longicauda	Blue fairy flycatcher	F	3	0.1
Terpsiphone viridis	Paradise flycatcher	S	3	—
Parus leucomelas	Black tit	S	1	—
Nectarinia verticalis	Green-headed sunbird	S	3	1.03
Nectarinia venusta	Variable sunbird	S	1	—
Nectarinia preussi	**Preuss's sunbird**	—	—	0.52
Nectarinia cuprea	Copper sunbird	S	3	—
Nectarinia coccinigaster	Splendid sunbird	S	3	—
Zosterops senegalensis	Yellow white-eye	S	3	—
Serinus mozambicus	Yellow-fronted canary	S	1	—
Clytospiza monteiri	Brown twinspot	S	1	0.1
Clytospiza dybowskii	Dybowski's twinspot	S	1	—
Estrilda melipoda	Orange-cheeked waxbill	S	3	—
Estrilda nonnula	Black-crowned waxbill	S	3	0.52
Estrilda astrild	Common waxbill	S	3	—
Estrilda bengala	Red-cheeked cordon-bleu	S	3	—
Lagonosticta rufopicta	Bar-breasted fire-finch	—	—	0.1
Lagonosticta rubricata	African fire-finch	—	—	0.1
Lonchura cucullata	Bronze manikin	S	1	—
Ploceus cucullatus	Village weaver	S	3	—
Ploceus superciliosus	Compact weaver	S	1	—
Ploceus ocularis	Spectacled weaver	F	2	0.62
Ploceus nigricollis	Black-necked weaver	—	—	0.31
Euplectes axillaris	Fan-tailed whydah	S	2	—
Euplectes macrourus	Yellow-mantled whydah	S	3	—
Lamprotornis splendidus	Splendid glossy starling	S	1	—
Lamprotornis purpureus	Purple glossy starling	S	1	—
Lamprotornis chloropterus	Lesser blue-eared glossy starling	S	3	—
Cinnyricinclus leucogaster	Amethyst starling	S	1	—
Dicrurus ludwigii	Square-tailed drongo	—	—	0.21
Dicrurus atripennis	Shining drongo	—	—	0.1
Dicrurus adsimilis	Drongo	S	1	—
Ptilostomus afer	Piapiac	S	1	—

Total species = 129 Individuals netted/1,000 m-hr = 13.10

WAKWA

An agricultural research station 20 km from Ngaoundaba Ranch on the Adamawa Plateau, this site is also savanna with gallery forest as described by Louette (1981) and Letouzey (1968). The nets were placed in a very small gallery forest, no more than 50 m wide. The gallery has been encroached upon by adjacent farmers who cut and burn to plant crops, and is also heavily used for wood gathering.

Avian Species Richness and Relative Abundance

As at nearby Ngaoundaba Ranch, we experienced low capture rates of only 14.93 per m-hr in this small gallery (Table 21). The number of species was relatively high, at 96.

Table 21. Birds mist-netted and/or observed at Wakwa, Cameroon, 28 June-4 July, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. All mist-netted birds were caught in forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Phalacrocorax africanus	Reed cormorant	L	1	—
Ardea cinerea	Grey heron	L	1	—
Bostrychia hagedash	Hadada ibis	S	1	—
Gyps bengalensis	African white-backed vulture	S	2	—
Lophaetus occipitalis	Long-crested hawk-eagle	S	2	—
Francolinus bicalcaratus	Double-spurred francolin	S	3	—
Coturnix sp.	Quail	S	1	—
Sarothrura pulchra	White-spotted flufftail	—	—	0.1
Sarothrura sp.	Flufftail	F	3	—
Streptopelia semitorquata	Red-eyed dove	F	3	—
Turtur afer	Red-billed wood dove	F, S	2	0.1
Treron australis	African green pigeon	S	1	—
Poicephalus senegalus	Senegal Parrot	S	1	—
Agapornis pullaria	Red-headed lovebird	S	2	—
Tauraco leucolophus	White-crested touraco	F	3	—
Musophaga rossae	Lady Ross's touraco	F	2	—
Crinifer piscator	Western grey plantain-eater	F	1	—
Clamator jacobinus	Black and white cuckoo	F	1	—
Cuculus solitarius	Red-chested cuckoo	F	3	—
Ceuthmochares aereus	Yellowbill coucal	—	—	0.1
Centropus senegalensis	Senegal coucal	S	3	—
Macrodipteryx vexillarius	Pennant-winged nightjar	S	1	—
Cypsiurus parvus	African palm Swift	S	3	—
Colius striatus	Speckled mousebird	S	3	—
Ceryle rudis	Pied kingfisher	L	1	—
Alcedo cristata	Malachite kingfisher	F	1	0.1
Ceyx picta	African pigmy kingfisher	F	3	0.31
Halcyon malimbica	Blue-breasted kingfisher	F	3	0.52
Merops bulocki	Red-throated bee-eater	F/S	3	—
Coracias abyssinica	Abyssinian roller	S	1	—
Lybius bidentatus	Tooth-billed barbet	F/S	2	—
Lybius vieilloti	Vieillot's barbet	S	2	—

Pogoniulus bilineatus	Lemon-rumped tinkerbird	F	2	0.42
Indicator minor	Lesser honeyguide	F	2	0.31
Dendropicos fuscescens	Cardinal woodpecker	S/F	1	0.1
Mesopicos goertae	Grey woodpecker	S	1	—
Hirundo abyssinica	Lesser striped swallow	S	3	—
Psalidoprocne petiti	Petit's roughwing	S	3	—
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S	1	0.1
Pycnonotus barbatus	Common bulbul	S, F	3	0.31
Andropadus virens	Little greenbul	F	3	1.25
Chlorocichla flavicollis	Yellow-throated leaf-love	F	3	0.73
Phyllastrephus scandens	Leaf-love	F	3	0.42
Nilaus afer	Brubru	S	1	—
Dryoscopis senegalensis	Zanzibar puffback	S	1	—
Tchagra minuta	Black-cap tchagra	S	1	—
Laniarius ferrugineus	Tropical boubou	F	3	0.1
Cossypha polioptera	Grey-winged robin-chat	F	3	0.73
Cossypha albicapilla	White-crowned robin-chat	F	2	0.42
Cossypha niveicapilla	Snowy-headed robin-chat	F	3	0.63
Turdus pelios	African thrush	F, S	3	0.21
Ptyrticus turdinus	Thrush babbler	F	3	0.31
Turdoides reinwardii	Black-cap babbler	F	3	0.1
Cisticola erythrops	Red-faced cisticola	—	—	0.1
Cisticola cantans	Singing cisticola	S	2	—
Cisticola lateralis	Whistling cisticola	S	3	—
Cisticola natalensis	Croaking cisticola	S	3	—
Cisticola brachyptera	Siffling cisticola	S	3	0.1
Prinia subflava	Tawny-flanked prinia	S	3	—
Prinia leucopogon	White-chinned prinia	F	3	0.52
Apalis flavida	Yellow-chested apalis	F	2	—
Apalis bamendae	**Bamenda apalis**	F	2	—
Drymocichla incana	Red-winged grey warbler	F	3	—
Hypergerus atriceps	Oriole warbler	F	3	0.42
Camaroptera brachyura	Grey-backed camaroptera	F	3	0.42
Eremomela pusilla	Green-backed eremomela	S/F	3	—
Melaenornis edolioides	Black flycatcher	S	3	—
Bradornis pallidus	Pale flycatcher	S	3	—
Batis minor	Black-headed puff-back flycatcher	S	1	—
Platysteira cyanea	Scarlet-spectacled wattle-eye	—	—	0.73
Trochocercus longicauda	Blue fairy flycatcher	F	3	—
Parus leucomelas	Black tit	S	1	—
Anthreptes longuemarei	Violet-backed sunbird	S	1	—
Nectarinia verticalis	Green-headed sunbird	F	2	0.42
Nectarinia preussi	**Preuss's sunbird**	F	3	1.15
Nectarinia cuprea	Copper sunbird	S	3	—
Zosterops senegalensis	Yellow white-eye	S,F	3	—
Emberiza cabanisi	Cabani's bunting	S	1	—
Serinus mozambicus	Yellow-fronted canary	S, F	3	0.21
Clytospiza monteiri	Brown twinspot	—	—	0.42
Clytospiza dybowskii	Dybowski's twinspot	F	2	0.1
Pirenestes ostrinus	Black-bellied seedcracker	F	3	0.52
Nesocharis capistrata	Grey-headed olive-back	F	1	0.52
Estrilda melipoda	Orange-cheeked waxbill	S	3	0.42
Estrilda nonnula	Black-crowned waxbill	S/F	3	0.42
Estrilda bengala	Red-cheeked cordon-bleu	S	2	—

Lonchura cucullata	Bronze manikin	S	3	0.42
Ploceus baglafecht	Baglafecht's weaver	F	2	0.1
Ploceus nigricollis	Black-necked weaver	—	—	0.31
Euplectes macrourus	Yellow-mantled whydah	S	3	—
Vidua macroura	Pin-tailed whydah	S	1	—
Lamprotornis purpureus	Purple glossy starling	S	3	—
Buphagus africanus	Yellow-billed oxpecker	S	1	—
Dicrurus ludwigii	Square-tailed drongo	F	2	0.21
Dicrurus adsimilis	Drongo	S	1	—
Ptilostomus afer	Piapiac	S	1	—
Total species = 96	Individuals netted/1,000 m-hr = 14.93			

TIBATI

This site is similar to the other sites on the Adamawa Plateau, though closer to the forest-savanna mosaic to the south than are the others. Netting took place in a narrow (30-50 m wide) gallery forest.

Avian Species Richness and Relative Abundance

The 125 avian species recorded at Tibati was one of the highest numbers of species for the ecotone sites (Table 22). The capture rate here was also relatively high, with 33.14 birds caught per m-hr.

Table 22. Birds mist-netted and/or observed at Tibati, Cameroon, 5-10 July, 1995. Habitat codes indicate habitat where birds were observed: S = savanna, F = forest, S/F = savanna/forest edge. All mist-netted birds were caught in forest. Abundance codes: 1 = observed once or rarely, 2 = observed more than once but not common, 3 = observed daily or common. Species in bold are considered montane by many authors. Capture rate is number of birds caught per 1,000 m-hr.

Species	Vernacular Name	Habitat	Abun-dance	Capture rate
Phalacrocorax africanus	Reed cormorant	F	3	
Scopus umbretta	Hammerkop	S	1	
Bostrychia hagedash	Hadada ibis	F	2	
Plectropterus gambensis	Spur-winged goose	S	1	
Neophron monachus	Hooded vulture	S	2	
Gypohierax angolensis	Palm-nut vulture	S	1	
Accipiter ovampensis	Ovampo sparrowhawk	S	1	
Kaupifalco monogrammicus	Lizard buzzard	F	1	
Lophaetus occipitalis	Long-crested hawk-eagle	F,S	2	
Elanus caeruleus	Black-shouldered kite	S	2	
Macheirhamphus alcinus	Bat hawk	F	1	
Francolinus bicalcaratus	Double-spurred francolin	S	3	
Francolinus squamatus	Scaly francolin	F	1	
Limnocorax flavirostra	Black crake	F	3	
Sarothrura pulchra	White-spotted flufftail	F	3	
Vanellus senegallus	African wattled lapwing	S	3	
Streptopelia semitorquata	Red-eyed dove	F	3	
Turtur tympanistria	Tambourine dove	F	3	2.41
Turtur afer	Red-billed wood dove	F	3	3.38
Treron australis	African green pigeon	F,S	3	
Agapornis pullaria	Red-headed lovebird	F,S	3	
Tauraco leucolophus	White-crested touraco	F,S	3	

Crinifer piscator	Western grey plantain-eater	S	3	
Cuculus solitarius	Red-chested cuckoo	F	3	
Chrysococcyx caprius	Didric's cuckoo	S	3	
Ceuthmochares aereus	Yellowbill coucal	F	1	
Centropus senegalensis	Senegal coucal	F,S	3	
Otus scops	Common scops owl	S	1	
Apus affinis	Little swift	S	3	
Cypsiurus parvus	African palm Swift	S	3	
Chaetura sabini	Sabine's pin-tail swift	S	2	
Colius striatus	Speckled mousebird	F,S	3	0.32
Alcedo cristata	Malachite kingfisher	F	2	0.32
Ceyx picta	African pigmy kingfisher	F	3	1.13
Halcyon malimbica	Blue-breasted kingfisher	F	3	0.97
Merops bulocki	Red-throated bee-eater	F/S	3	0.97
Lybius bidentatus	Tooth-billed barbet	F	3	0.64
Lybius leucocephalus	White-headed barbet	S	1	
Lybius vieilloti	Vieillot's barbet	S	2	
Buccanodon duchaillui	Yellow-spotted barbet	F	1	
Pogoniulus chrysoconus	Yellow-fronted tinkerbird	S	1	
Pogoniulus bilineatus	Lemon-rumped tinkerbird	F	3	0.32
Indicator minor	Lesser honeyguide	F/S	2	
Dendropicos fuscescens	Cardinal woodpecker	F,S	2	
Dendropicos obsoletus	Lesser white-spotted woodpecker	F/S	1	
Galerida modesta	Sun lark	S	3	
Hirundo smithii	Wire-tailed swallow	S	3	
Hirundo senegalensis	Mosque swallow	S	3	
Hirundo abyssinica	Lesser striped swallow	S	3	
Psalidoprocne petiti	Petit's roughwing	S	3	0.48
Macronyx croceus	Yellow-throated longclaw	S	3	
Campephaga phoenicea	Red-shouldered cuckoo-shrike	S	2	
Pycnonotus barbatus	Common bulbul	F,S	3	0.32
Andropadus virens	Little greenbul	F	3	1.29
Chlorocichla flavicollis	Yellow-throated leaf-love	F,S	3	2.41
Chlorocichla simplex	Simple leaf-love	F	3	
Phyllastrephus scandens	Leaf-love	F	2	0.32
Dryoscopus angolensis	**Pink-footed puffback**	F	2	
Tchagra minuta	Black-cap tchagra	F,S	2	
Tchagra senegala	Black-headed tchagra	S	2	0.16
Laniarius ferrugineus	Tropical boubou	F	3	0.16
Laniarius erythrogaster	Black-headed gonolek	F	2	0.16
Corvinella corvina	Yellow-billed shrike	S	2	
Lanius collaris	Fiscal shrike	S	1	
Cossypha polioptera	Grey-winged robin-chat	F	2	0.48
Cossypha albicapilla	White-crowned robin-chat	F	3	0.48
Turdus pelios	African thrush	F,S	3	0.48
Ptyrticus turdinus	Thrush babbler	F	2	0.16
Turdoides plebejus	Brown babbler	S	2	
Turdoides reinwardii	Black-cap babbler	F	2	0.48
Sphenoeacus mentalis	Moustached scrub-warbler	S	3	
Cisticola erythrops	Red-faced cisticola	F,S	3	0.97
Cisticola cantans	Singing cisticola	F,S	2	
Cisticola lateralis	Whistling cisticola	S	3	0.16
Cisticola natalensis	Croaking cisticola	S	2	
Prinia subflava	Tawny-flanked prinia	S	3	

Prinia leucopogon	White-chinned prinia	F	3	0.8
Apalis flavida	Yellow-chested apalis	F	2	0.16
Apalis bamendae	**Bamenda apalis**	F	2	
Drymocichla incana	Red-winged grey warbler	F/S	2	0.48
Hypergerus atriceps	Oriole warbler	F	3	1.29
Camaroptera brachyura	Grey-backed camaroptera	F,S	2	0.64
Eremomela pusilla	Green-backed eremomela	F/S	3	
Sylvietta brachyura	Crombec/nuthatch warbler	S	1	
Melaenornis edolioides	Black flycatcher	S	3	
Hyliota flavigaster	Yellow-bellied flycatcher	S	2	
Batis minor	Black-headed puff-back flycatcher	S	2	
Platysteira cyanea	Scarlet-spectacled wattle-eye	F	3	0.32
Trochocercus longicauda	Blue fairy flycatcher	F,S	3	
Terpsiphone viridis	Paradise flycatcher	F,S	3	0.32
Parus leucomelas	Black tit	S	2	
Salpornis spilonota	Spotted creeper	S	2	
Anthreptes longuemarei	Violet-backed sunbird	S	1	
Anthreptes collaris	Collared sunbird			0.16
Nectarinia verticalis	Green-headed sunbird	F,S	3	1.61
Nectarinia venusta	Variable sunbird	S	2	
Nectarinia preussi	**Preuss's sunbird**	F	3	
Nectarinia bouvieri	Orange-tufted sunbird	F/S	2	
Nectarinia cuprea	Copper sunbird	S	3	
Nectarinia coccinigaster	Splendid sunbird	S	3	
Emberiza cabanisi	Cabani's bunting	F	2	
Serinus mozambicus	Yellow-fronted canary	S,S/F	3	
Serinus gularis	Streaky-headed seed-eater	S	1	
Clytospiza monteiri	Brown twinspot	S,F	3	1.29
Clytospiza dybowskii	Dybowski's twinspot	F	2	0.48
Pirenestes ostrinus	Black-bellied seedcracker	F	3	1.93
Nesocharis capistrata	Grey-headed olive-back	F/S	2	0.48
Estrilda melipoda	Orange-cheeked waxbill	S	3	
Estrilda nonnula	Black-crowned waxbill	S,S/F	3	0.32
Estrilda bengala	Red-cheeked cordon-bleu	S	3	
Lagonosticta rufopicta	Bar-breasted fire-finch			0.64
Lagonosticta rubricata	African fire-finch	F	2	0.16
Lonchura cucullata	Bronze manikin	S	3	
Ploceus cucullatus	Village weaver	S,S/F	3	0.32
Ploceus nigerrimus	Viellot's weaver	F,S/F	3	0.64
Ploceus ocularis	Spectacled weaver	F	2	0.32
Ploceus nigricollis	Black-necked weaver	F	1	
Ploceus sp.	Weaver			0.8
Euplectes afer	Yellow-crowned bishop	S	1	
Euplectes macrourus	Yellow-mantled whydah	S	3	0.16
Euplectes sp.	Bishop/Whydah			0.48
Passer griseus	Grey-headed sparrow	S	2	
Lamprotornis splendidus	Splendid glossy starling	F,S	3	
Buphagus africanus	Yellow-billed oxpecker	S	2	
Oriolus auratus	African golden oriole	F	2	
Dicrurus ludwigii	Square-tailed drongo	S	2	0.32
Dicrurus adsimilis	Drongo	S	3	

Total species = 125 Individuals netted/1,000 m-hr = 33.14

LITERATURE CITED

Barnes, R. F. W. and K. L. Jensen. 1987. How to Count Elephants in Forests, African Elephant and Rhino Specialist Group.

Collar, N. J., M. J. Crosby, A. J. Slattersfield. 1994. Birds to Watch: The World List of Threatened Birds, Bird Life International.

Collar, N. J. and S. N. Stuart. 1985. Threatened birds of Africa and Related Islands. Cambridge, ICBP/IUCN.

Collar, N. J. and S. N. Stuart. 1988. Key Forests for Threatened Birds in Africa. Cambridge, International Council for Bird Preservation.

Dorst, J. and P. Dandelot. 1993. Larger Mammals of Africa. London, Harper Collins.

Elgood, J. H., J. B. Heigham, A. M. Moore, A. M. Nason, R. E. Sharland, and N. J. Skinner. 1994. The Birds of Nigeria: An annotated check-list. B.O.U. Check-list No. 4, Second Ed. British Ornithologist's Union, The Natural History Museum, Tring, UK.

Fay, M. 1988. Forest monkey populations in the Central African Republic: the northern limits. A census in Manovo-Gounda-St. Floris National Park. Mammalia 52: 57-74.

Groombridge, B., ed. 1994. IUCN Red List of Threatened Animals. IUCN Monograph No. 5. Cambridge.

Hall, J. 1993. Report on the Strategic Planning Mission for the Creation of a Protected Area in the Lobeke Region of Southeastern Cameroon: Assessment of Timber Exploitation, Safari Hunting, and Preliminary Vegetation Analysis, Wildlife Conservation Society.

Hall, J. B. 1973. Vegetation zones on the southern slopes of Mount Cameroon. Vegetatio 27: 49-69.

Letouzey, R. 1968. Etude phytogeographique du Cameroon. Paris, Editions Paul Lechavalier.

Louette, M. 1981. The birds of Cameroon. An annotated checklist. Verhandelingen van de Koniklijke Academie voor Wetenschappen, Letterer Schone Kunsten van Belgie. Klasse de Wetenschappen 43: 1-295.

Macworth-Praed, C. W., and C. H. B. Grant. 1981. Birds of West Central and Western Africa. African Handbook of Birds, Series 3. Volumes 1 and 2. Longman, Inc. New York.

Morton, J. K. 1972. Phytogeography of the west African mountains. *In*: Taxonomy, Phytogeography and Evolution. D. H. Valentine, ed. London, London Academic Press.

Morton, J. K. 1986. Montane vegetation. *In*: Plant Ecology in West Africa Systems and Processes. G. W. Lawson, ed. Chichester, John Wiley and Sons, Ltd.

Napier, J. R. and P. H. Napier. 1994. The Natural History of the Primates. Cambridge, MA, MIT Press.

N. R. C. 1981. Techniques for the Study of Primate Population Ecology. Washington, D. C., National Academy Press.

Richards, P. W. 1963. Ecological notes on West African vegetation. Journal of Ecology 51: 529-554.

Serle, W., G. J. Morel, W. Hartwig. 1977 The Collins Field Guide to The Birds of West Africa. Stephen Greene Press, Lexington, MA.

Smith, T. B. 1990. Resource use by bill morphs of an African finch: evidence for intraspecific competition. Ecology 71: 1246-1257.

Smith, T. B. and D. McNiven. 1993. Preliminary survey of the avifauna of Mt. Tchabal Mbabo, west-central Cameroon. Bird Conservation International 3: 13-19.

Stromayer, K. A. K. and A. Ekobo. 1991. Biological Surveys of Southeastern Cameroon, Wildlife Conservation International.

Stuart, S. N., ed. 1986. Conservation of Cameroon Montane Forests. Cambridge, International Council for Bird Preservation.

White, J. T. 1994. Biomass of rain forest mammals in the Lope Reserve, Gabon. Journal of Animal Ecology 63: 499-512.