

IUCN/SSC PRIMATE SPECIALIST GROUP
**ACTION PLAN FOR
AFRICAN PRIMATE
CONSERVATION:
1986-90**



Compiled by

J.F. Oates

Hunter College and the Graduate Center
City University of New York



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and

Regional Coordinator for Africa
IUCN/SSC Primate Specialist Group





Rain forest understory in the Okomu Forest Reserve, Nigeria. Like other Nigerian Forest Reserves, Okomu is subjected to heavy commercial logging (photo by John F. Oates).

Foreword

In 1977, Sir Peter Scott, then Chairman of the IUCN Species Survival Commission, asked all Specialist Group Chairmen to prepare Global Conservation Strategies for the animal groups for which they were responsible. In response to this, the Primate Specialist Group prepared a 325 page document that included 69 projects costing a total of \$3,104,250. Though never published or widely circulated, this document represented the first attempt to approach primate conservation problems on a global rather than merely local basis, and also the first attempt to establish international priorities for primate conservation.

This Global Strategy was sent to a number of conservation organizations and attracted the attention of two in particular, World Wildlife Fund and the New York Zoological Society, which immediately began funding projects identified in this plan. Less than two years later, World Wildlife Fund also established its own Primate Program to deal with international conservation problems. This program has been able to find support for and implement some 100 projects, large and small, in over 30 countries. In addition to many other primate conservation activities, it produces *Primate Conservation*, the Journal and Newsletter of the IUCN/SSC Primate Specialist Group, which is the major means of communication among the world's primate conservationists.

The New York Zoological Society has also continued a major involvement in primate conservation, and further support has come from such organizations as Wildlife Preservation Trust International, the Brookfield Zoo, the National Geographic Society, the Fauna and Flora Preservation Society and the Frankfurt Zoo. It is not unfair to say that a good portion of this interest in primate conservation can be attributed to the work of the Primate Specialist Group and the concern generated by the original Global Strategy for Primate Conservation.

Unfortunately, the original Global Strategy is now eight years old and

quite out-of-date. A new global review is in order, so that we can continue to follow sound scientific guidelines in determining our international primate conservation priorities during the remainder of this decade.

Since our data base on primates and their conservation needs has grown tremendously over the past few years, it is no longer practical to prepare a single global plan. Instead, we are now in the process of developing *regional* action plans for Africa, Madagascar, Asia and the Neotropical region. This, the Action Plan for African Primate Conservation, is the first in the new series.

This African Action Plan has been compiled by Dr. John F. Oates, in collaboration with the African Section of the Primate Specialist Group, and it would never have been possible without Dr. Oates' dedication and expertise based on 20 years of work with African primates. We think that the plan summarizes both the primate *and* tropical forest conservation needs of the African continent in a clear and succinct manner, and we hope that it will help to stimulate the kind of action required to make sure that *all* African primate species survive in their natural habitats. All that is needed is a little more than \$2,000,000 over the next five years, a very small sum in global terms, especially when we consider what is at stake and what we stand to lose if we are unable to undertake the projects identified.

On behalf of the whole Species Survival Commission, I would like to take this opportunity to thank Dr. Oates and the other members of the African Section of the Primate Specialist Group for their outstanding contribution. Thanks also to UNEP and World Wildlife Fund for making publication of this plan possible.

Russell A. Mittermeier
Chairman, IUCN/SSC Primate
Specialist Group

Compiler's note and acknowledgments

This plan, produced under the auspices of the IUCN Species Survival Commission, has evolved from the first Global Strategy for Primate Conservation, prepared by R.A. Mittermeier in January 1978, and from a planning paper on African rain forest primate conservation prepared by J.S. Gartlan, T.T. Struhsaker and the compiler in October 1981. To gather information for this new plan, a request for information was sent out to members of the African section of the IUCN/SSC Primate Specialist Group in December, 1983, and the information received was incorporated into a draft of this document that was completed in December, 1984. Comments on that draft, and new information received up to the end of August, 1985, have been incorporated into this version. For the information and advice they have provided during this long production process, special thanks are due to the following: N. Badrian, S.K. Bearder, C. Boesch, T.M. Butynski, J. Carter, R.I.M. Dunbar, J.S. Gartlan, A. Gautier, J.G. Else, J.E. Fa, A.H. Harcourt, C. Harcourt, M.J.S. Harrison, J.A. Hart, M. Kavanagh, J. S. Kingdon, S. Lahm, W.C. McGrew, R.A. Mittermeier, T. Nishida, T. Olson, A.L.

Peal, P.T. Robinson, A. Rodgers, J. Sabater Pi, T.T. Struhsaker, J. Thornback, C.E.G. Tutin, A. Vedder, S.K. Wasser, the IUCN Conservation Monitoring Centre, the Conservation Committee of the International Primatological Society, and the Conservation Working Party of the Primate Society of Great Britain. Editing and design of this publication were carried out by W. R. Konstant and S. D. Nash, and typing done by J. Viola at the Department of Anatomical Sciences, State University of New York at Stony Brook. Stephen Nash drew the maps.

Although care has been taken to ensure that the finished plan reflects the best expert advice available, it is inevitable that some of the experts disagree on details. In these cases, an effort has been made to follow an objective, unbiased course. This is obviously more easily said than done, and the compiler must therefore take responsibility for any biases, errors, or omissions that are still present.

Department of Anthropology, Hunter College
New York, September 1985



The Chimpanzee (*Pan troglodytes*). Africa's great apes, the chimpanzees and the gorilla, are the closest living relatives of the human species (photo by G. Teleki).

Introduction

The primates of Africa are of special interest and significance. They play important roles in most of the continent's diverse ecosystems, especially in rain forest, where they commonly form a major part of the biomass of mammalian herbivores. They are also of considerable significance in terms of human history. Man's closest relatives, the chimpanzee and gorilla, inhabit the forests of tropical Africa, and much evidence suggests that many major events in human evolution occurred on the African continent. In several respects, Africa's primates and the ecosystems of which they are a vital part may be regarded as a living museum of human history, where processes of adaptation and speciation can be studied in the environment in which our own species evolved. The loss of a significant portion of these resources would be a very serious matter. This loss is occurring today and will soon be irretrievable if firm, well-planned action is not taken.

This is the Action Plan for the period 1986-90 developed by the African section of the Primate Specialist Group of the IUCN/SSC to avert major losses in Africa's primate fauna. It covers the continent of Africa and the islands of its continental shelf. It does not encompass Madagascar, for which a separate plan is being prepared. The Primate Specialist Group (PSG) is one of several groups of experts providing technical advice to the Species Survival Commission of the International Union for the Conservation of Nature and Natural Resources (IUCN). The PSG, chaired by R.A. Mittermeier, has set itself the main goal of maintaining the current diversity of the order Primates, with a dual emphasis on:

- (1) ensuring the survival of endangered and vulnerable species wherever they occur; and
- (2) providing effective protection for large numbers of primates in areas of high primate diversity and/or abundance.

Human activities make it inevitable that a large part of the world's primate populations and their habitats will disappear. The Primate Specialist Group feels that, with respect to action directed specifically at primate populations and their habitats, these losses can best be mitigated by:

- (1) setting aside protected areas for endangered and vulnerable species;
- (2) creating large national parks and reserves in areas of high primate diversity and/or abundance;
- (3) maintaining or increasing the effectiveness of parks and reserves that already exist; and
- (4) creating and increasing public awareness of the need for primate conservation and the importance of primates both as a part of the natural heritage of the countries in which they occur, and as important components in systems whose proper functioning is vital for human well-being.

The principles underlying these goals are that effective habitat conservation is essential if wild populations are to survive in the long term, and that conservation will not work if people living in the areas where primates occur do not fully support conservation efforts.

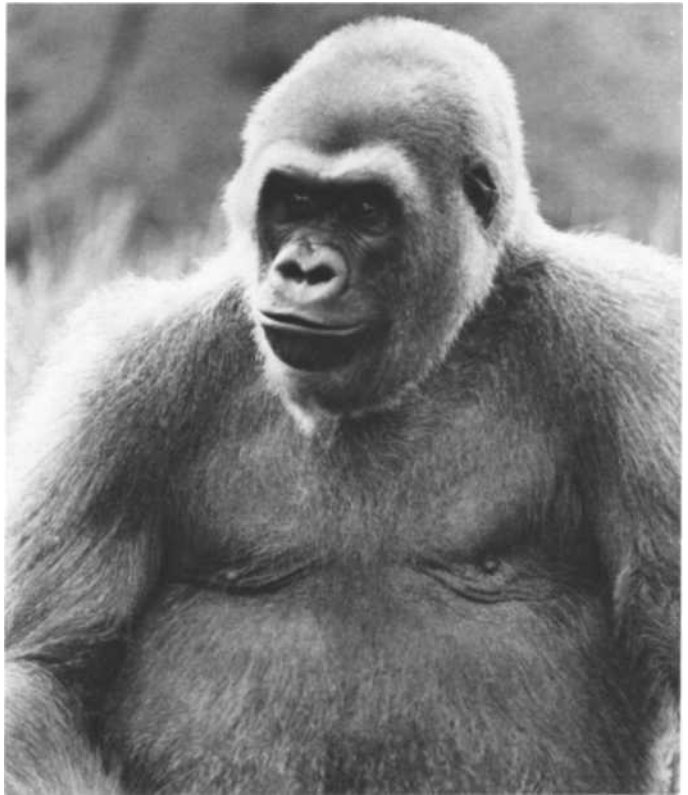
As a scientific advisory group, we feel that the most appropriate action the Primate Specialist Group can take to help in achieving these goals is to establish the current patterns of distribution and diversity of the African primate fauna, to assess the threats it faces, and to establish priorities among specific projects aimed at the establishment and management of protected areas. These projects include basic surveys where the distribution and status of primate populations are judged to be poorly known. While our ideal is the creation of many large, strictly-protected reserves in representative biogeographic regions, we recognize that in many cases it is going to be impossible in practice to create such reserves. In these cases we must determine what forms of multiple-use management do the least damage to primate populations and encourage the implementation of this management. In this context, we must be aware that conservation plans will only be effective if they take account of local political and economic realities, and we must try to integrate primate conservation efforts into national resource conservation plans.

Although this Action Plan concentrates on establishing priorities for surveys and reserve management programs, we do not wish to minimize the very strong need almost everywhere in Africa to increase public awareness of the need for and value of conservation. We see a major need for conservation training programs for scientists and managers from African countries, and we believe that illegal traffic in primates must be prevented.

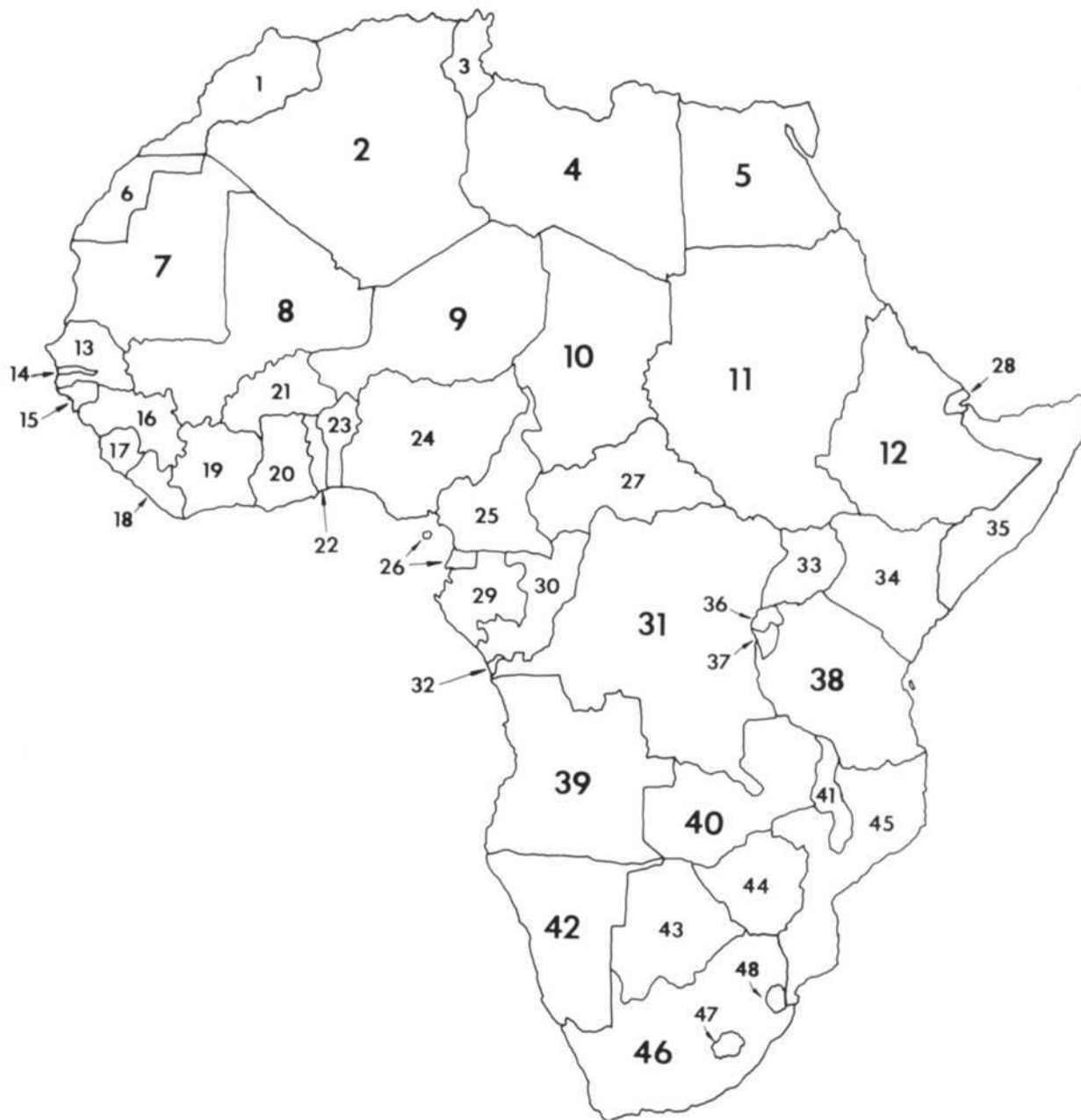
To achieve our chief goal of maintaining current diversity, we must first establish what the current pattern of diversity is. This means drawing up a catalogue of distinct forms, and mapping their patterns of geographical distribution, paying particular attention to areas inhabited by a large number of different forms. Having established existing patterns we can then study the relative degree of threat faced by individual forms and by local groups of forms (communities), and we can determine priorities for conservation action. This Plan, therefore:

- (1) presents a species list of African primates;
- (2) assesses the degree of threat to each of these species, as well as noting distinctive subspecies which may be under threat;
- (3) reviews the distribution of distinct African primate communities, paying special attention to communities with high levels of species diversity or species endemism;
- (4) lists projects designed to better conserve threatened species and communities, with an estimate of costs; and
- (5) establishes priorities among these projects, based on the number of primate species involved, their taxonomic uniqueness, and the degree to which they are endangered.

The plan is transnational in its scope. It considers what action is needed to maintain the diversity of primates on a continent-wide basis. It does not address national concerns. Within some countries, one or a few primate species that are common elsewhere may be rare or threatened. In a transnational plan of this sort these cases are not given special attention, but they should obviously be an important part of national conservation strategies, under which individual countries endeavor to protect all elements of their native fauna and flora.



The low land gorilla (*Gorilla gorilla gorilla*) of western Equatorial Africa is the subspecies of this ape most frequently seen in captivity. Captive animals were often obtained in the past by shooting mothers and taking the young. Today, many zoo gorillas are born in captivity (photo by Andrew Young).



- | | | | |
|------------------|------------------|-----------------------------|-----------------|
| 1 Morocco | 13 Senegal | 25 Cameroon | 37 Burundi |
| 2 Algeria | 14 Gambia | 26 Equatorial Guinea | 38 Tanzania |
| 3 Tunisia | 15 Guinea-Bissau | 27 Central African Republic | 39 Angola |
| 4 Libya | 16 Guinea | 28 Djibouti | 40 Zambia |
| 5 Egypt | 17 Sierra Leone | 29 Gabon | 41 Malawi |
| 6 Western Sahara | 18 Liberia | 30 Congo | 42 Namibia |
| 7 Mauritania | 19 Ivory Coast | 31 Zaire | 43 Botswana |
| 8 Mali | 20 Ghana | 32 Cabinda (Angola) | 44 Zimbabwe |
| 9 Niger | 21 Burkina Faso | 33 Uganda | 45 Mozambique |
| 10 Chad | 22 Togo | 34 Kenya | 46 South Africa |
| 11 Sudan | 23 Benin | 35 Somalia | 47 Lesotho |
| 12 Ethiopia | 24 Nigeria | 36 Rwanda | 48 Swaziland |

Map 1. The nations of Africa. Primate species lists for the 24 countries which have ten or more primate species are given in Appendix 1 (map by Stephen Nash).

Classification

The classification adopted (Table 1) is purposefully conservative, in the sense that any population or set of populations considered by respected authorities in relatively recent times to represent a distinct genus or species is generally given that status here. This course is followed so that too low a priority is not given to conserving a population that, when gone, is recognized to have been very distinctive.

The classification of the Lorisidae is based on Petter and Petter-Rousseaux (1979), but the galago forms *garnettii*, *thomasi* and *zanzibaricus* are regarded as distinct species, following the studies of Kingdon (1971), Olson (1979), and Bearder (1984). There is currently considerable debate as to the most appropriate generic-level classification of the galagos. Rather than adopt one particular arrangement which is not yet widely accepted, the conservative course followed here is to provisionally place all species in the genus *Galago*. Further taxonomic studies are needed.

The classification of the Cercopithecinae is broadly, but not entirely, in agreement with that of Napier (1981), who recognizes the genus *Mandrillus* as being distinct from *Papio*, and the genera *Erythrocebus* and *Miopithecus* as distinct from *Cercopithecus*. It differs from Napier in the following respects:

(1) The westernmost populations of mangabeys are regarded as belonging to a separate species *Cercocebus atys*, distinct from *C. torquatus* (following Booth, 1958).

(2) *Cercopithecus denti* and *C. wolffi* are regarded as subspecies of *C. pogonias*, on the basis of their distribution and a study of their vocalizations (J.S. Gartlan and T.T. Struhsaker, pers. comm.).

(3) *Cercopithecus albogularis* is regarded as distinct from *C. mitis* following Dandelot (1971) and Ruvolo (1983).

(4) *Cercopithecus salongo*, known only from two museum specimens, is given provisional species status (*C. ? salongo*) in our classification. The coat pattern of this animal is very distinctive, and seems unlikely to be the result of hybridization. *Cercopithecus "dryas"* is not, however, regarded as a valid species; the only known specimen is the skin of a once-captive juvenile that might be either a hybrid or even a member of *C. salongo*.

(5) We have noted as a possibly distinct species (*Cercopithecus ? sp.*) the animals recently discovered in Gabon by M. Harrison, which apparently belong to the *lhoesti-preussi* group. Note that Napier regards *C. lhoesti* and *C. preussi* as distinct species.

(6) We have also given Slater's guenon from eastern Nigeria provisional species status (*C. ? sclateri*) following Kingdon (1980).

(7) Napier follows Barros Machado (1969) in recognizing two species of *Miopithecus* (distinct northern and southern forms). Here, we regard the northern form as questionably distinct (*Miopithecus ? sp.*).

The African Colobinae present a difficult problem. There is no generally agreed classification. The generic arrangement used here is that of Kuhn (1967), who groups the red and olive colobus into *Procolobus*, distinct from the black and black-and-white forms in *Colobus*. Within the black-and-white group, the specific arrangement followed is that proposed by Oates and Trocco (1983), who separate the West African *vellerosus* from *polykomos*. The species-level systematics of *Procolobus* have yet to be adequately resolved. The inadequacy of conventional red colobus classifications (placing them all in the species *badius*) has been noted by Dandelot (1971). The degree of variation between the different forms is too great to be adequately contained within a single species and it would therefore be better to regard the red colobus as a superspecies as defined by Mayr (1942): a monophyletic group of allopatric species which are morphologically too distinct to be included in one species. However, the number of red colobus species that can be recognized within the group is still unclear, partly because many populations have yet to be studied in the wild. For the purposes of this plan, we have modified Dandelot's arrangement of five species (*badius*, *pennanti*, *rufomitrat*).



A female talapoin (*Miopithecus*) at her sleeping site in the Gabon forest. An infant is clinging to her and behind her a juvenile is hidden (photo by A. Devež, CNRS).

tholloni and *kirkii*) to take account of evidence on vocalizations (Struhsaker, 1981). Five species are provisionally recognized: *Procolobus [badius] badius* (including the subspecies *badius*, *temminckii* and *waldroni*), *P. [badius] pennanti* (including the subspecies *pennanti*, *preussi* and *bouvieri*), *P. [badius] rufomitrat* (including the subspecies *rufomitrat*, *tholloni*, *oustaleti*, *elliotti*, *foai* and *tephrosceles*), *P. [badius] gordonorum*, and *P. [badius] kirkii*. Square brackets are used to designate the superspecies, following the recommendation of Amadon (1966); such brackets could equally be applied to other superspecies groups (the *cephus*-group of guenons, for instance) but in those cases the species names are in such widespread use that they are unlikely to lead to confusion. It should be stressed that the many subspecies of red colobus listed above are clearly distinct from one another. To avoid the repeated use of cumbersome and unfamiliar terminology when referring to these subspecies, the main text of this report will generally refer to, for example, "the *tephrosceles* form of red colobus" rather than to '*Procolobus [badius] rufomitrat tephrosceles*'.

The classification of the Pongidae is that in most widespread use, and is that used by Honacki *et al.* (1982) and by Wolfheim (1983). Behaviorally and ecologically, we regard the gorilla as sufficiently distinct from the chimpanzee to warrant generic separation.

Table 1
Classification of African Primates

Family Lorisidae					
Subfamily Lorisinae					
<i>Arctocebus calabarensis</i>	Angwantibo		<i>Cercopithecus lhoesti</i>		l'Hoest's monkey
<i>Perodicticus polio</i>	Potto		<i>Cercopithecus preussi</i>		Preuss's monkey
Subfamily Galaginae			<i>Cercopithecus</i> ? sp.		Harrison's monkey
<i>Galago alleni</i>	Allen's galago		<i>Cercopithecus albogularis</i>		Sykes's monkey
<i>Galago demidovii</i>	Dwarf galago		<i>Cercopithecus mitis</i>		Blue monkey
<i>Galago inustus</i>	Eastern needle-clawed galago		<i>Cercopithecus nictitans</i>		Putty-nosed guenon
<i>Galago senegalensis</i>	Senegal galago, or bushbaby		<i>Cercopithecus petaurista</i>		Spot-nosed guenon
<i>Galago thomasi</i>	Thomas's galago		<i>Cercopithecus</i> ? <i>sclateri</i>		Sclater's guenon
<i>Galago zanzibaricus</i>	Zanzibar galago		<i>Cercopithecus erythrogaster</i>		White-throated guenon
<i>Galago elegans</i>	Western needle-clawed galago		<i>Cercopithecus erythrotis</i>		Red-eared guenon
<i>Galago crassicaudatus</i>	Thick-tailed galago		<i>Cercopithecus cephus</i>		Moustached guenon
<i>Galago garnettii</i>	Garnett's galago		<i>Cercopithecus ascanius</i>		Red-tailed guenon
Family Cercopithecidae			<i>Cercopithecus campbelli</i>		Campbell's monkey
Subfamily Cercopithecinae			<i>Cercopithecus mona</i>		Mona monkey
<i>Macaca sylvanus</i>	Barbary macaque		<i>Cercopithecus pogonias</i>		Crowned monkey
<i>Cercocebus atys</i>	Sooty mangabey		<i>Cercopithecus aethiops</i>		Green monkey, vervet
<i>Cercocebus torquatus</i>	Red-capped mangabey		<i>Miopithecus talapoin</i>		Southern talapoin
<i>Cercocebus galeritus</i>	Crested mangabey		<i>Miopithecus</i> ? sp.		Northern talapoin
<i>Cercocebus albigena</i>	Grey-cheeked mangabey		<i>Allenopithecus nigroviridis</i>		Allen's swamp monkey
<i>Cercocebus aterrimus</i>	Black mangabey		<i>Erythrocebus patas</i>		Patas monkey
<i>Papio papio</i>	Guinea baboon		Subfamily Colobinae		
<i>Papio anubis</i>	Anubis baboon		<i>Procolobus [badius] badius</i>		Western red colobus
<i>Papio cynocephalus</i>	Yellow baboon		<i>Procolobus [badius] pennanti</i>		Pennant's red colobus
<i>Papio hamadryas</i>	Hamadryas baboon		<i>Procolobus [badius] rufomitratu</i>		Peters' red colobus
<i>Papio ursinus</i>	Chacma baboon		<i>Procolobus [badius] kirki</i>		Zanzibar red colobus
<i>Mandrillus sphinx</i>	Mandrill		<i>Procolobus [badius] gordonorum</i>		Uhehe red colobus
<i>Mandrillus leucophaeus</i>	Drill		<i>Procolobus verus</i>		Olive colobus
<i>Theropithecus gelada</i>	Gelada		<i>Colobus polykomos</i>		Western black-and-white colobus
<i>Cercopithecus diana</i>	Diana monkey		<i>Colobus vellerosus</i>		Geoffroy's black-and-white colobus
<i>Cercopithecus</i> ? <i>salongo</i>	Salongo monkey		<i>Colobus guereza</i>		Guereza
<i>Cercopithecus neglectus</i>	De Brazza's monkey		<i>Colobus satanas</i>		Black colobus
<i>Cercopithecus hamlyni</i>	Owl-faced monkey		<i>Colobus angolensis</i>		Angolan black-and-white colobus
			Family Pongidae		
			<i>Pan troglodytes</i>		Chimpanzee
			<i>Pan paniscus</i>		Bonobo, pygmy chimpanzee
			<i>Gorilla gorilla</i>		Gorilla



Senegal bushbabies (*Galago senegalensis*). This savanna species is the most widespread of all prosimians (photo by S. Bearder).

Priority Ratings of Species and Subspecies for Conservation Action

Table 2 displays Priority Ratings of African primate species for conservation action. Species have been rated on three parameters:

- (1) degree of threat to populations;
- (2) taxonomic uniqueness of species;
- (3) association of species with other threatened forms.

Ratings are on a 1-6 scale for degree of threat, on a 1-3 scale for degree of taxonomic uniqueness, and are 1 or 2 for association with other threatened primates. Ratings on each parameter are then summed to produce an overall rating for conservation action. According to this system, an overall rating of 11 would accrue to a highly-endangered species that is the sole member of its genus and which occurs in an area where several other threatened primates are found. On the other hand, a species under no special threat which has several close relatives and is not part of a highly threatened community would get an overall rating of 3.

The weighting in this particular rating system is designed to give highly endangered species special attention, while taking some account of their distinctiveness and the degree of threat to the community of which they are a part. A system which has the same scale (e.g., 1-5) for each parameter was rejected since it discriminates against some endangered forms that are obviously worthy of special attention. For instance, in a rating system giving similar weight to degree of threat, taxonomic uniqueness, and association with other threatened forms, a species such as the Barbary macaque (*Macaca sylvanus*) gets a low priority rating compared with a relatively common, unthreatened species (e.g. *Perodicticus potto*) which belongs to a small genus and inhabits a multispecies community containing some threatened members.



The endangered Barbary macaque (*Macaca sylvanus*) is the only African representative of a widespread Asian genus (photo by Dominique Vallet).



The diana monkey (*Cercopithecus diana*) is a highly arboreal guenon restricted to the high forests of the Upper Guinea region where it is threatened by habitat destruction and hunting (photo by John F. Oates).

A rating system of this type has been employed so that relatively objective general guidelines for conservation can be established. However, it should be appreciated that the ratings are inevitably somewhat arbitrary. They are based on existing evidence available to the compiler, evidence that is often scanty.

Ratings have been assigned according to the following criteria:

a. Degree of Threat

1. Not known to be especially rare or threatened.
2. Rare or at risk. Populations exist at a low density and/or in a limited geographical area, and individuals may not be readily located in a short-term search even by professionals; or, a widely-distributed species not yet under threat as a whole, but with a significant number of populations definitely at risk from habitat alteration and/or hunting.
3. Vulnerable. Populations have limited distribution and/or ecological tolerance, and current rates of habitat alteration and/or hunting pressure likely to intensify; or, current rates of habitat alteration and/or hunting are slowly but significantly diminishing most populations. High probability of moving to category 4 by the year 2000 if no new conservation measures are taken.
4. Highly vulnerable. Surviving populations small or fragmented, and threatened by habitat destruction and/or hunting. Likely to move to category 5 by the year 2000 if no new conservation measures are taken.
5. Endangered. Population restricted to a very limited area, or with a very fragmented distribution; less than 25,000 individuals probably remain, and these are threatened by major habitat alteration and/or severe hunting; likely to move to category 6 by the end of the century if current destructive forces continue to operate.
6. Highly endangered. Less than 10,000 individuals remain, and no large section of the population is really secure.

b. Taxonomic Uniqueness

1. A member of a large species group (i.e., one of several closely-related species), or species status sometimes questioned, but at least a distinct subspecies.
2. A very distinct species, or one of a small number of closely-related forms which together are clearly distinct from other species.
3. Only member of a monotypic genus (or family), or member of a genus with only two species.

c. Association with Other Threatened Primates

1. A wide-ranging species, and/or most of range does not overlap with any highly threatened form.
2. A major part of the species' range overlaps with one or more highly threatened forms, or several that are under moderate threat.

Table 2
Conservation Priority Ratings for African Primate Species

Species	Degree of Threat	Taxonomic Uniqueness	Assoc. with Other Threatened Forms	Total Rating
Lorisidae				
<i>Arctocebus calabarensis</i>	2	3	2	7
<i>Perodicticus potto</i>	1	3	1	5
<i>Galago alleni</i>	1	2	2	5
<i>Galago demidovii</i>	1	2	1	4
<i>Galago inustus</i>	2	2	2	6
<i>Galago senegalensis</i>	1	2	1	4
<i>Galago thomasi</i>	2 ^a	2	2	6
<i>Galago zanzibaricus</i>	3	2	2	7
<i>Galago elegantulus</i>	1	2	2	5
<i>Galago crassicaudatus</i>	1	2	1	4
<i>Galago garnettii</i>	1	2	2	5
Cercopithecidae				
<i>Macaca sylvanus</i>	5	2	1	8
<i>Cercocebus atys</i>	2	2	2	6
<i>Cercocebus torquatus</i>	3	2	2	7
<i>Cercocebus galeritus</i>	3	2	2	7
<i>Cercocebus albigena</i>	1	2	2	5
<i>Cercocebus aterrimus</i>	3	2	2	7
<i>Papio papio</i>	3	1	1	5
<i>Papio anubis</i>	1	1	1	3
<i>Papio cynocephalus</i>	1	1	1	3
<i>Papio hamadryas</i>	3	1	2	6
<i>Papio ursinus</i>	1	1	1	3
<i>Mandrillus leucophaeus</i>	5	2	2	9
<i>Mandrillus sphinx</i>	3	2	2	7
<i>Theropithecus gelada</i>	4	3	1	8
<i>Cercopithecus diana</i>	4	2	2	8
<i>Cercopithecus ? salongo</i>	4 ^b	2 ^b	2 ^b	8
<i>Cercopithecus neglectus</i>	2	2	2	6
<i>Cercopithecus hamlyni</i>	4	2	2	8
<i>Cercopithecus lhoesti</i>	3	2	2	7
<i>Cercopithecus preussi</i>	5	2	2	9
<i>Cercopithecus ? sp. (Gabon)</i>	4	2	2	8
<i>Cercopithecus mitis</i>	1	2	1	4
<i>Cercopithecus albogularis</i>	1	1	1	3
<i>Cercopithecus nictitans</i>	2	2	2	6
<i>Cercopithecus petaurista</i>	1	1	2	4
<i>Cercopithecus erythrogaster</i>	5	1	2	8
<i>Cercopithecus ? sclateri</i>	6	1	2	9
<i>Cercopithecus erythrotis</i>	4	1	2	7
<i>Cercopithecus cephus</i>	1	1	2	4
<i>Cercopithecus ascanius</i>	1	1	2	4
<i>Cercopithecus campbelli</i>	1	1	1	3
<i>Cercopithecus mona</i>	1	1	1	3
<i>Cercopithecus pogonias</i>	1	1	1	3
<i>Cercopithecus aethiops</i>	1	2	1	4
<i>Miopithecus talapoin (south)</i>	3	3	1	7
<i>Miopithecus ? sp. (north)</i>	1	3	2	6
<i>Allenopithecus nigroviridis</i>	3	3	2	8
<i>Erythrocebus patas</i>	1	3	1	5
<i>Procolobus [badius] badius</i>	3	1	2	6
<i>P. [badius] pennanti</i>	5	1	2	8
<i>P. [badius] rufomitratus</i>	3	1	2	6
<i>P. [badius] kirkii</i>	6	1	1	8
<i>P. [badius] gordonorum</i>	6	1	2	9
<i>Procolobus verus</i>	3	2	2	7
<i>Colobus polykomos</i>	3	1	2	6
<i>Colobus vellerosus</i>	3	1	2	6
<i>Colobus guereza</i>	1	2	1	4
<i>Colobus satanas</i>	4	2	2	8
<i>Colobus angolensis</i>	1	2	2	5
Pongidae				
<i>Pan troglodytes</i>	3	3	1	7
<i>Pan paniscus</i>	4	3	2	9
<i>Gorilla gorilla</i>	4	3	2	9

Notes to Table 2:

a. The status of *Galago thomasi* is not known. It is given a rating of "2" for degree of threat on the basis of a relatively limited and disjunct distribution in E. Zaire, E. Africa, Angola, and possibly Mt. Cameroon.

b. *Cercopithecus salongo* is known only from a few skins from the Wamba area of Zaire. If this specimen is the representative of a distinct species, the population must have a limited distribution. The Wamba area suffers from hunting and habitat destruction.



The Nigerian white-throated guenon (*Cercopithecus erythrogaster*) has one of the most restricted distributions of all African primates and its remaining populations are under intense pressure (photo by John F. Oates).

On the basis of table 2, the highest conservation priority rating (9) applies to the following species:

- Mandrillus leucophaeus*
- Cercopithecus preussi*
- Cercopithecus ? sclateri*
- Procolobus [badius] gordonorum*
- Pan paniscus*
- Gorilla gorilla*

The following have a very high conservation rating (8):

- Macaca sylvanus*
- Theropithecus gelada*
- Cercopithecus diana*
- Cercopithecus hamlyni*
- Cercopithecus ? salongo*
- Cercopithecus ? sp. (Gabon)*
- Cercopithecus erythrogaster*
- Allenopithecus nigroviridis*
- Procolobus [badius] pennanti*
- Procolobus [badius] kirkii*
- Colobus satanas*



The angwantibo (*Arctocebus calabarensis*) is a short-tailed, careful climber, related to the potto and the Asian lorises. It is one of the rarest of African prosimians (photo by P. Jewell).

These have a high priority (rating 7):

Arctocebus calabarensis
Galago zanzibanicus
Cercocebus torquatus
Cercocebus galeritus
Cercocebus aterrimus
Mandrillus sphinx
Cercopithecus lhoesti
Cercopithecus erythrotis
Miopithecus talapoin (south)
Procolobus verus
Pan troglodytes

And the following species are regarded as vulnerable (Threat Rating 3 or greater), but are not very distinctive taxonomically:

Papio papio
Papio hamadryas
Procolobus [badius] badius
Procolobus [badius] rufomitratu
Colobus polykomos
Colobus vellerosus

All these 34 species (54% of African primate species) are judged to need some conservation attention, but priority should be given to the species with the highest ratings (8 and 9).

Threatened Subspecies

This plan does not aim to assess the status of all the very many subspecies of primate that have been described from Africa. The real distinctiveness of many of these forms is questionable. However, there are a few clearly distinct local populations (not usually given species status) which have a very limited geographical distribution and consequently a small population size. Many of these populations are threatened

not only because of their small population size, but also through habitat alteration and hunting. If the existing diversity of African primates is to be maintained, these populations require special attention. They are:

<i>Cercocebus galeritus galeritus</i>	Tana River, Kenya
<i>Cercocebus galeritus</i> subsp.	Uzungwa Mountains, Tanzania
<i>Cercopithecus erythrotis erythrotis</i>	Bioko (Fernando Po), Equatorial Guinea
<i>Cercopithecus ascanius atrinasus</i>	Angola
<i>Cercopithecus mitis kandti</i>	Virunga Volcanoes
<i>Procolobus [badius] pennanti bouvieri</i>	Congo Republic-
<i>Procolobus [badius] pennanti pennanti</i>	Bioko
<i>Procolobus [badius] pennanti preussi</i>	W. Cameroon and possibly E. Nigeria
<i>Procolobus [badius] rufomitratu</i> <i>rufomitratu</i>	Tana River, Kenya
<i>Procolobus [badius] rufomitratu</i> <i>tephrosceles</i>	W. Uganda, Tanzania, possibly Burundi
<i>Procolobus [badius] badius</i> <i>temminckii</i>	Gambia, Senegal, Guinea Bissau
<i>Colobus angolensis prigoginei</i>	Mt. Kabolo, SE Zaire
<i>Colobus angolensis ruwenzorii</i> (incl. <i>C. a. adolfifriedrici</i>)	Ruwenzori Mts., L. Kivu area and W. shore of L. Victoria
<i>Colobus angolensis</i> subsp.	Mahale Mts., Tanzania
<i>Gorilla gorilla beringei</i>	Virunga Volcanoes and Bwindi Forest



A young mountain gorilla (*Gorilla gorilla beringei*). The remaining population of this endangered subspecies may number less than 400 (photo by Amy Vedder/Bill Weber).



Map 2. The eleven distinct regional communities of African primates featured in this plan. Except for desert areas, much of the remainder of the continent carries savanna vegetation with a relatively uniform community of primates that is not currently under great threat. With the exception of the Casamance and Maghreb, regions are mapped here on the basis of vegetation distributions shown by White (1983) (map by Stephen Nash).

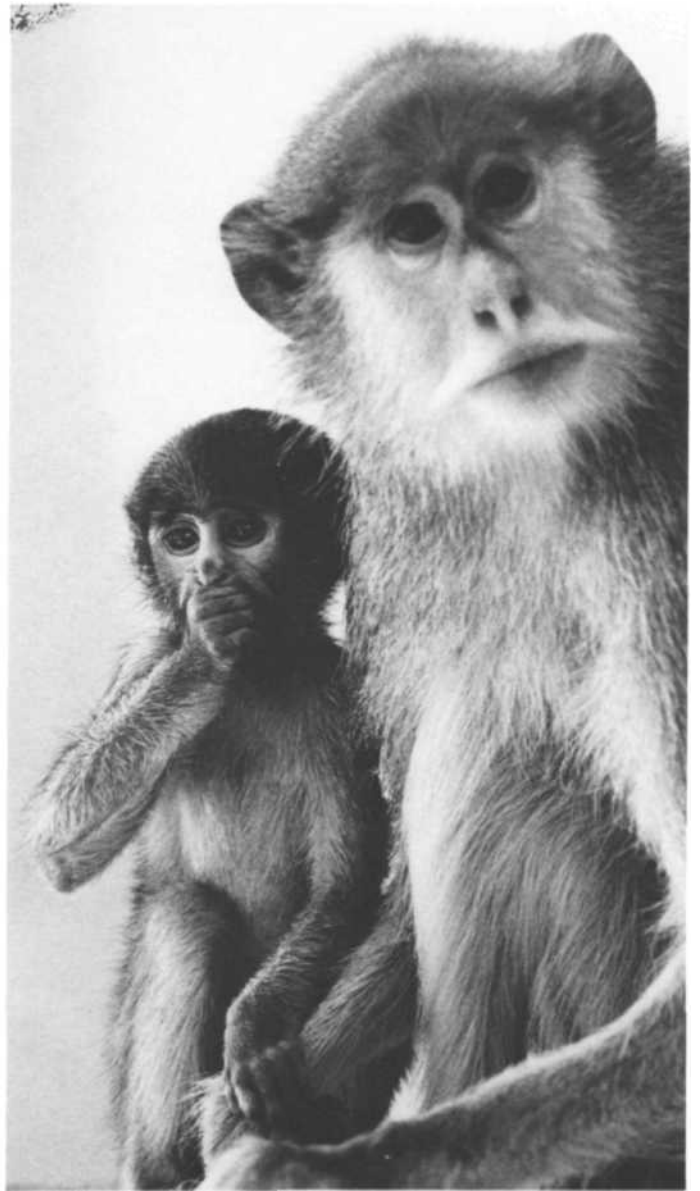
Distinct Communities and Ecosystems

Two types of ecosystem may be regarded as particularly important from the viewpoint of conservation, especially if our aim is to maintain diversity: (1) those containing many species, and (2) those with high levels of species endemism. Especially high priority should be given to the protection of such ecosystems when they contain individual primate species which are rated to have a high priority for conservation action.

With the exception of *Maraca sylvanus* and *Papio ursinus* all African primate species have all or most of their populations within the tropics. Much of tropical Africa is covered by dry woodland, wooded savanna, grassland and scrub supporting a low diversity of primates at relatively low densities. Most of the primates in this savanna zone have wide geographical distributions, within which are many National Parks and other reserves providing reasonably good protection to primate populations. Especially limited regions, supporting several endemic primates, are not typical of the savanna zone. One exception, the Casamance region, in the far west of the zone, is given special consideration below. The primates of the Ethiopian Highlands and adjacent regions are also distinctive, although their habitat is peripheral to the main savanna zone. With



Cercopithecus aethiops is a wide-ranging species, typical of riverine forests throughout the savanna zone of Africa. It has invaded parts of the rain-forest zone where the vegetation has been opened up by farming (photo by Russell A. Mittermeier).



The patas monkey (*Erythrocebus patas*) is an inhabitant of savanna woodland, from Senegal to Tanzania. It is still an abundant species in parts of West Africa (photo by San Diego Zoo).

these exceptions, the African savanna primates do not appear to be especially threatened at present (in fact they are regarded as vermin in many countries). However, there is as yet no widespread monitoring program (similar to that in place for Indian rhesus macaques) that allows us to make robust statements on population trends in any African primate.

It is Africa's forest primates that occur in the most diverse communities, often show high levels of local endemism, are frequently ecological specialists occurring at low population densities, and live in habitats that are most threatened with alteration as a result of human activities. This plan will therefore focus on forest primates. African forests supporting primates are of several types. There is lowland tropical rain forest, occurring as a block across the western and central equatorial areas of the continent, dissected by major rivers, mountain ranges, and savanna intrusions. There is gallery forest, supported by groundwater from large perennial rivers. There is a small area of coastal forest growing in a local area of moderate rainfall on the East African coast. And there are the temperate forests in the Mediterranean zone of North Africa. Each of these different forest types tends to support a special assemblage of primates.

The Lowland Rain Forest Zone

Although the African rain forest occupies a smaller area than the South American or Asian rain forests,¹ and has a lower overall species diversity of plants and animals than those areas, it supports one of the most diverse primate communities on earth (about 50 species altogether). But as is the case elsewhere in the tropics, it is the rain-forest zone that is under most pressure as a result of population growth and agricultural and economic development. The annual rate of human population growth in Africa for 1980-90 has been projected as in excess of 3% . greater than in tropical America or Asia (Barr, 1981). Meanwhile, environmental conditions, inefficient techniques and a lack of capital resources are causing rates of food production in Africa to lag behind those in other tropical areas (World Bank, 1984). The resulting food shortages are putting great pressure on many forest areas from subsistence agriculture.

It is in the rain forest zone also that primates come under the greatest hunting pressure from man. Even where pressures on forest land are not yet great, primates are often hunted for food. Thus, if the diversity of the African primate fauna is to be maintained, major conservation efforts must be made in the rain forest. Since flourishing primate populations are usually good indicators of the general health of a rain forest ecosystem, successful efforts to conserve these primates will usually involve conservation of the system as a whole.

In relatively undisturbed African forests where there is low hunting pressure, it is not uncommon to find 7-10 sympatric monkey species, together with 1-2 apes and 2-5 prosimians. Such species assemblages are typical of the forests along the Guinea Coast of West Africa between Sierra Leone and Ghana, of the Cameroon and Western Equatorial regions stretching from eastern Nigeria to the Oubangui River, and of the forests of the Congo Basin² and eastern Zaire. Five distinct primate communities can be recognized within this broad zone, each containing several endemic forms. These communities may have differentiated during dry phases of the Pleistocene, when the African rain forest is believed to have retracted and fragmented. Each community is here considered separately, starting in the west. A subsequent section deals with six further distinct primate communities which occur elsewhere on the continent. All eleven communities are shown on Map 2.

Footnotes

1. The African rain forest is estimated to occupy 1.5-2 million km², versus 5.0 million for the American forest and 3.0 million for the Asian forest (Myers, 1980; National Research Council, 1980; UNESCO, 1978).
2. Congo River/Basin are used here instead of Zaire River/Basin as *geographical* rather than political terms. A significant portion of the river borders the Republic of Congo, which has not renamed this major continental feature.



Monkey meat is an important source of animal protein for many people in the African rain forest, but excessive hunting may carry some species to extinction. Here a hunter holds a female white-throated guenon he has just shot in Nigeria's Okomu Forest Reserve (photo by John F. Oates).



Primary lowland rain forest in West Africa, the Gola Forest of Sierra Leone (photo by John F. Oates).



Destruction of lowland rain forest to make way for a pulpwood plantation, southern Nigeria (photo by John F. Oates).

Upper Guinea

This westernmost community is separated from the equatorial communities by the Dahomey Gap, a thinly-forested area extending from east of the Volta River in Ghana to the Western edge of Nigeria (see Map 3). The Upper Guinea forests support 7-8 endemic primate species: *Cercocebus atys*, *Cercopithecus diana*, *Cercopithecus petaurista*, *Cercopithecus campbelli*, *Procolobus [badius] badius*, *Procolobus verus* (which has an additional small population in Nigeria), *Colobus polykomos*, and *Colobus vellerosus* (sometimes considered conspecific with *C. polykomos*). A subspecies of *Cercopithecus nictitans*, *C. n. stampflii*, occurs only in the forests of Upper Guinea and Nigeria.

Colobus polykomos and *C. vellerosus* meet in the area between the Bandama and Sassandra Rivers in south-central Ivory Coast. The subspecies of most of the other monkeys change in southwestern Ivory Coast between the Cavally and Sassandra Rivers. The area should therefore be considered as consisting of two major subregions in terms of its primates: Upper Guinea West and Upper Guinea East. Upper Guinea West has the higher rainfall and exhibits the most faunal and floral diversity and endemism; it has been proposed that a major Pleistocene forest refuge was located in this subregion, which includes the extreme south of the Republic of Guinea as well as southern Sierra Leone, all of Liberia and the extreme southwest of Ivory Coast. Endemic primates are *Colobus polykomos*, *Cercocebus atys atys*, *Cercopithecus diana diana*, *C. petaurista buettikoferi*, *C. campbelli campbelli* and the *badius* subspecies of red colobus. Other endemic mammals include the pygmy hippopotamus (*Choeropsis liberiensis*), Jentink's duiker (*Cephalophus jentinki*), the banded duiker (*Cephalophus zebra*), and Kuhn's mongoose (*Liberiictis kuhni*). Hunting of primates for food by man is intense in this region, particularly in Liberia, and many of the remaining forests are threatened by commercial logging.

The Upper Guinea East subregion is smaller and has a denser human population than Upper Guinea West. Many of the major towns of Ghana and the Ivory Coast are located in or close to the subregion. The area has a low level of endemism at the species level, although the two larger colobus living here are both sometimes regarded as distinct species: *Procolobus [badius] waldroni* and *Colobus vellerosus*. Endemic subspecies are *Cercocebus atys lunulatus*, *Cercopithecus diana roloway*, *Cercopithecus petaurista petaurista*, and *Cercopithecus campbelli lowei*.

For further information on the Upper Guinea area and its primates, see Booth, 1958; Dosso *et al.*, 1981; Galat & Galat-Luong, 1985; Gartlan, 1982; Kuhn, 1965; Robinson, 1971 & 1983; and Verschuren, 1982.



The red-capped mangabey (*Cercocebus torquatus*) is a largely terrestrial rain forest species that is a favorite target for hunters (photo by Russell A. Mittermeier).



The olive colobus monkey (*Procolobus verus*) is an elusive inhabitant of West African rain forests. It is the world's smallest colobine monkey. From right to left in this picture are an adult male, an adult female and a juvenile (photo by John F. Oates).

Cameroon

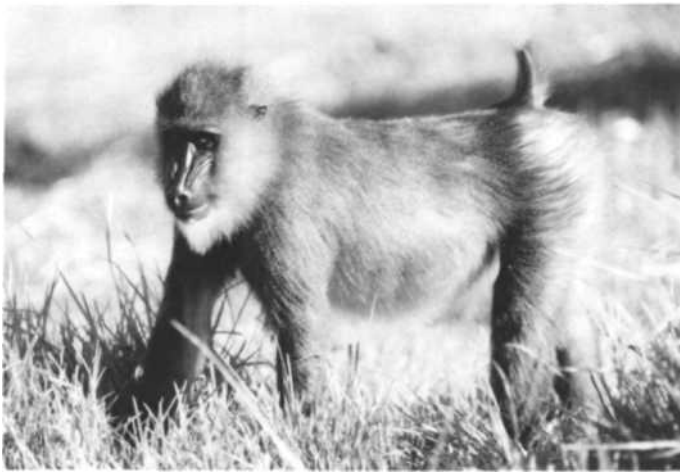
This region is centered on Mt. Cameroon and extends from eastern Nigeria to the Sanaga River (Map 4). It includes the nearby continental island of Fernando Po (now called Bioko). It shares many species with the Western Equatorial Region south of the Sanaga River, but has a high level of faunal and floral diversity and high levels of endemism (especially at high elevation, where many species are related to forms on East African mountains). Primate species endemic to the Cameroon region are *Mandrillus leucophaeus*, *Cercopithecus preussi*, and *Cercopithecus erythrotis* (each of which has an endemic subspecies on Bioko). Species found only in the Cameroon and W. Equatorial regions, with different subspecies either side of the Sanaga are *Arctocebus calabarensis*, *Galago alleni*, *Galago elegantulus*, and *Procolobus [badius] pennanti*. The *Colobus satanas* population on Bioko is sometimes considered subspecifically distinct from the only other population, in the W. Equatorial region. *Cercocebus torquatus* is found in both the Cameroon and W. Equatorial regions and also in western Nigeria, and does not show obvious subspecific variation.

The 2,000 km² island of Bioko is a component of the state of Equatorial Guinea. The 30 km wide channel between the island and the mainland is only 100 m deep, so that the island must have been linked to the mainland during the last glaciation. It is therefore a site that can provide valuable evidence on the Quaternary history of the West African forest. However, there has been very little recent biological investigation on Bioko (largely because of difficult economic and political circumstances), and the present status of the island's unique fauna and flora, containing many endemic forms, is not known. There is believed to be very intense hunting pressures on the remaining larger mammals, and most of the lowland forest was converted to plantations long ago. However, in the very wet southwest of the island the montane vegetation of the large Caldera de San Carlos is probably still intact. Most of the island's primates once occurred in the area between the Caldera and the southern coastal settlement of Ureka. No effective conservation measures are known to exist.

For further information on Cameroon and Bioko, see Eisentraut, 1973; Gartlan, 1975; and Sanderson, 1940.

Western Equatorial Africa

This region comprises the forest zone of Cameroon south of the Sanaga River, Gabon, mainland Equatorial Guinea, the Congo Republic, and the far south of the Central African Republic, together with the Angolan enclave of Cabinda and the Mayombe Forest of Zaire (north of the Congo River) (Map 5). This is a very significant area in global terms for primate conservation. At least 20 species of nonhuman primate occur here, in a forested area of about 1,000,000 km². Much of the forest is apparently still in a relatively pristine condition, has a low population density of people (including hunter-gatherer pygmies), and supports what are probably the largest remaining populations of *Gorilla gorilla* and *Pan troglodytes*. Endemic primate species are *Mandrillus sphinx*, *Cercopithecus cephus* and *Miopithecus* sp. (northern form) and a *Cercopithecus* monkey related to *C. lhoesti* recently discovered by Harrison. Among endemic subspecies is the highly endangered *bouvieri* form of red colobus. Further information on the primates of this region may be found in Charles-Dominique, 1977; Gartlan & Struhsaker, 1972; Gautier & Gautier-Hion, 1969; Gautier-Hion, 1966; Sabater Pi & Jones, 1967; Spinage, 1980; and Tutin & Fernandez, 1984.



A young mandrill (*Mandrillus sphinx*). The mandrill is a forest-living relative of the savanna baboons. Like the closely-related drill of the Cameroon region to the north, the mandrill of western Equatorial Africa is heavily hunted for its meat throughout much of its range (photo by Russell A. Mittermeier).

Congo Basin

This region covers the large forested area south of the main bend of the Congo River, including the forest network which extends south of the main forest block along the numerous tributaries of the Congo (Map 6). It has a low human population density. Most of the region is within Zaire, but it also includes the northern part of Angola. Levels of specific endemism in the fauna are relatively low, suggesting that this may not have been a major Pleistocene refuge area. However, several endemic subspecies occur here. In fact, two somewhat distinct primate faunas occur in the Congo Basin: one in the central basin, north of the Kasai River, and one south of the Kasai, extending into Angola. The most notable primate endemic in the Central Basin is the bonobo or pygmy chimpanzee (*Pan paniscus*), but this subregion is also home to *Cercopithecus pogonias wolfl* (sometimes considered a distinct species), the *tholloni* form of red colobus, *Cercopithecus ascanius whitesidei*, and *C. mitis maesi*. The few specimens of the puzzling *Cercopithecus salongo* also come from this area.

In the South Kasai subregion is found the southern form of talapoin monkey, as well as *Cercopithecus pogonias pyrogaster*, *C. ascanius ascanius* and *C. ascanius atrinasus*.

Two interesting forms of mangabey occur in the Congo Basin, *Cercocebus aterrimus* (sometimes considered a subspecies of *C. albigena*) and *C. galeritus chrysogaster* (sometimes considered a distinct species). The latter has a very restricted distribution. The unique and poorly-known swamp monkey, *Allenopithecus nigroviridis* lives along the Congo River

and its tributaries, both north and south of the Kasai.

For more information on this region, see Kano, 1984; Barros Machado, 1969; Schouteden, 1944; and Susman and Mubalamata, 1984.

Eastern Zaire

The upper part of the Congo River separates this region from the Congo Basin. It lies between the right bank of the river and the highlands of the western Rift Valley, extending from approximately the Elila River in the south to the Ituri River basin in the north (map 7). The ranges of many elements of the fauna extend west of the Ituri around the northern edge of the Congo Basin (meeting the Western Equatorial Region in the vicinity of the Oubangui River), while others reach east across the western Rift Valley, extending from approximately the Elila River in the south to the Ituri River basin in the north (Map 7). The ranges of many elements of the fauna extend west of the Ituri around the north-have been located in the area, referred to as the "Central Refuge" by Kingdon (1971) and "Ituri-Maniema" by Misonne (1963). Among endemic primates (shared with the Western Rift Region, see below) are *Galago inustus*, *Cercopithecus hamlyni*, *Cercopithecus lhoesti*, *Cercopithecus pogonias denti* and *Gorilla gorilla graueri*. Some other notable endemic mammals are the okapi (*Okapia johnstoni*), the giant genet (*Genetta victoriae*), and the aquatic civet (*Osbornictis piscivora*). Eastern Zaire still contains large areas of primary forest, but there are major differences in forest structure across the region which probably affect primate diversity and density. There is a paper by Rahm (1965) on the mammals of this region, but no ecological studies of its primates have yet been made.



An Allen's swamp monkey (*Allenopithecus nigroviridis*) being offered for sale in Zaire. This species inhabits swamps and gallery forests in both Zaire and the Congo Republic (photo by Thomas F. Kulesa).



The bonobo (*Pan paniscus*) occurs only in the forests south of the River Congo. This species is slightly smaller than its close relative the common chimpanzee and is an accomplished user of the high forest canopy. Logging concessions threaten its forest habitat (photo by N. Badrian).

Other Special Communities

In addition to the relatively large lowland forest regions with distinctive primate communities, several other regions of Africa have high degrees of endemism in their primate fauna at the specific or subspecific level. These regions are, from west to east: Casamance and Fouta Djallon, the Maghreb, Southern Nigeria, the Western Rift, the Ethiopian Highlands, and Coastal East Africa.

Casamance and Fouta Djallon

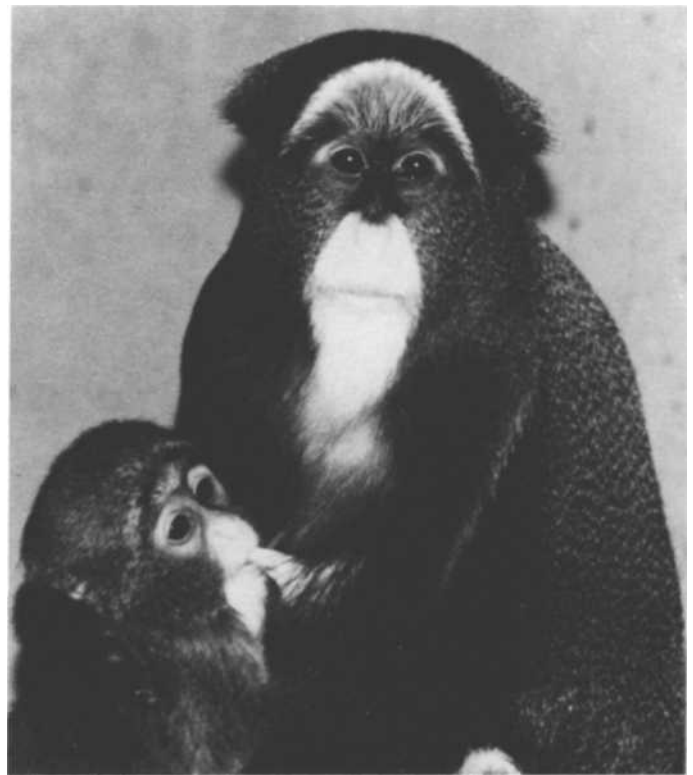
This small region covers southern Senegal, the Gambia, Guinea-Bissau and the western part of the Republic of Guinea (Map 8). It is the home of the least abundant form of savanna baboon (the Guinea baboon, *Papio papio*), the *temminckii* form of red colobus, and a significant population of chimpanzees. In the past, primates have been relatively well-protected in this part of West Africa because they are not hunted for food, but the human population is large and growing rapidly, producing extensive conversion of woodland habitats. Like other parts of the Sahelian zone, the area has been badly affected by drought. These factors probably put the region's primates in a vulnerable position, but large parts of the region have not had recent thorough surveys. There are two well-protected areas in southern Senegal, the Basse Casamance National Park and the Niokolo-Koba National Park (see McGrew *et al.*, 1981).

Maghreb

Apart from the small feral population on Gibraltar, *Macaca sylvanus* is today restricted to a few isolated areas of montane forest in Morocco and Algeria: fir forest in the Rif and Djebel Babor, and cedar and oak forests in the Moyen Atlas and Djurdjura (Map 9). These forests are coming under increasing human exploitation pressure (see Deag, 1977; Fa, 1983). There are no other primates in North Africa, and all other members of the genus *Macaca* live in Asia.

Southern Nigeria

The southern part of Nigeria between the border with the Republic of Benin and the Cross River (Map 10) is an intriguing area faunally. Here some elements of the Upper Guinea rain-forest system that have bridged the Dahomey Gap meet members of the Cameroon system to the east. There are also a few local endemic forms not found to east or west. Among these are two primates, *Cercopithecus erythrogaster* and *C. sclateri*. *C. erythrogaster* occurs only in the rain forests of southwest Nigeria, which are under intense exploitation pressure (lumbering, and conversion to plantations and farms), and where hunting pressure is also very severe. The highly vulnerable *Cercocebus torquatus* occurs in the same forests, which also still harbor precarious populations of chimpanzees and elephants. *C. sclateri* (considered by some authorities



The De Brazza's monkey (*Cercopithecus neglectus*) is widespread in riverine forests from Cameroon in the west to Kenya in the east. Kenyan populations are under threat from habitat fragmentation (photo by Russell A. Mittermeier).



Guinea baboons (*Papio papio*) in the Niokolo-Koba National Park, Senegal (photo by R. W. Byrne).



Mixed oak-forest habitat of the Barbary macaque in north Morocco (photo by John E. Fa).

to be a subspecies of *C. erythrotis*) is known only from four museum specimens, only one of which was collected in the wild (the others were captive animals of unknown origin). The wild specimen is from Okigwi, between the Niger and Cross Rivers in southeastern Nigeria, an area with a very high human population density where very little of the original forest cover remains. *Cercocebus torquatus* also occurs between the Niger and the Cross, as do *Arctocebus calabarensis*, *Galago eleganiulus* and, in the north, *Procolobus verus* (see Oates, 1982).

Western Rift

The forests at medium and high elevations along the Western (or Albertine) Rift Valley in East Africa (Map 11) are some of the most fascinating in the whole continent, and contain a large number of endemic and threatened primates. The most important areas for primate conservation along the Rift are the Kibale Forest of Uganda, the Bwindi-Kayonza Forest of Uganda, the Virunga Volcanoes, the Nyungwe-Kibira Forest of Rwanda and Burundi, the Gombe Stream National Park in Tanzania, and the Mahale Mountains National Park in Tanzania. Ecologically similar, but poorly known, are the mid-elevation forests on the Zaire side of the Rift, south of Beni.

The Western Rift forests are the home of the mountain gorilla (restricted to Bwindi and the Virungas), the *tephrosceles* form of red colobus, the little-known *Galago inustus*, and some highly localized forms of *Cercopithecus mitis* and *Colobus angolensis*. Major chimpanzee populations are found here. *Cercopithecus lhoesti* occurs at several of the sites, and *C. ascanius* is widespread.

The Kibale Forest in western Uganda, the Bwindi-Kayonza Forest of southwestern Uganda and the Nyungwe-Kibira Forest of southwestern Rwanda and northwestern Burundi are sites of special significance for primate conservation. They occupy altitudinal zones intermediate between the lowland forests of eastern Zaire and the montane forests of

the Virunga Volcanoes. The Kibale Forest (560 km²) lies between 1,100 and 1,600 m, Bwindi-Kayonza between 1,200 and 2,600 m, and the Nyungwe-Kibira Forest (1,140 km²) between 1,650 and 2,950 m. Each supports a somewhat different assemblage of primates; some of these are shared with the eastern Zaire forests, but a few of them are unique to this area. For instance Kibale contains much the largest remaining population of the *tephrosceles* form of red colobus, which is restricted to the medium-altitude forests along the eastern border of the lakes of the W. Rift Valley, from Kibale south to Sumbawanga in Tanzania. The Bwindi (or Impenetrable) Forest contains 10 species of primate, including gorillas, and Nyungwe contains a large population of *Colobus angolensis ruwenzorii*, which occurs only in the Lake Kivu area, on the Ruwenzori Mountains and in relic forests on the shore of Lake Victoria on the Uganda-Tanzania border. Another subspecies with a restricted range, *Cercopithecus mitis doggetti*, occurs in both Nyungwe and Bwindi. Kibale, Nyungwe and Bwindi support a very rich diversity of plant and animal species, contain large areas of undisturbed forest, and are located in areas where primates are not heavily hunted. They require special protection (see Harcourt, 1981; Storz, 1982; Struhsaker, 1981).

The Virunga Volcanoes are an important montane ecosystem on the eastern edge of the Congo Basin. They are most significant for primate conservation as the home of the largest population of the mountain race of the gorilla (*Gorilla gorilla beringei*), otherwise found only in the Bwindi Forest of Uganda (see Aveling & Harcourt, 1984; Harcourt & Curry-Lindahl, 1979; Weber & Vedder, 1983). The golden monkey, *Cercopithecus mitis kandti*, is restricted to the Virunga area.

Gombe Stream, on the shores of Lake Tanganyika, has been the site of a continuous study of chimpanzee behavior since 1960. In addition to chimpanzees, other forest primates at Gombe are the *tephrosceles* form of red colobus, *Cercopithecus ascanius schmidti*, and *C. mitis doggetti*.



The Bwindi Forest Reserve of southwestern Uganda (once known as the Impenetrable Forest) contains a significant population of mountain gorillas as well as a high diversity of other primates (photo by Russell A. Mittermeier).



The blue monkey (*Cercopithecus mitis*) is an abundant species in many of the high altitude forests along the Western Rift Valley in East Africa (photo by Russell A. Mittermeier).



The *tephrosceles* form of red colobus in the Kibale Forest, Uganda. Kibale supports the largest remaining population of this monkey (photo by Lysa Leland Struhsaker).

The Mahale Mountains on the eastern shore of Lake Tanganyika in Tanzania have been the site of chimpanzee research since 1965. The area contains a great diversity of ecosystems, from low-lying miombo woodland, through rain forest to Alpine grassland and bamboo. In addition to a population of about 700 chimpanzees (the largest in Tanzania), Mahale supports a great diversity of other fauna and flora. A National Park was established in 1984, but this park does not yet have proper anti-poaching control, except for a very small area where chimpanzees are studied. Among six monkeys in Mahale are *Cercopithecus mitis doggetti*, the *tephrosceles* form of red colobus and a form of *Colobus angolensis* that may be a new subspecies (see Nishida *et al.*, 1981).



The Virunga Volcanoes viewed from southwestern Uganda. Intensive cultivation around the bases and on the slopes of the volcanoes in Rwanda and Uganda has greatly restricted the habitat available to mountain gorillas and severed the link between the gorillas of Bwindi and the Virungas (photo by John F. Oates).

Ethiopian Highlands

The Ethiopian Highlands (Map 12) are a unique high altitude plateau (much of it above 3,000 m), extensively dissected by steep-sided river gorges. A few primates feature among a range of endemic animals: the gelada (*Theropithecus gelada*) and two subspecies of black-and-white colobus. *Colobus guereza guereza* and *C. guereza gallarum*. *Cercopithecus neglectus* occurs in forests in the southwestern highlands, but does not overlap with *T. gelada*, which today occurs only on the northern plateau. Much of the original grassland and forest of the high plateau has been destroyed by cultivation and tree cutting, and there has been heavy hunting of some primate populations, especially *C. guereza*. For more information, see Berhanu, 1974; Dandelot & Prévost, 1972; Dunbar, 1977.

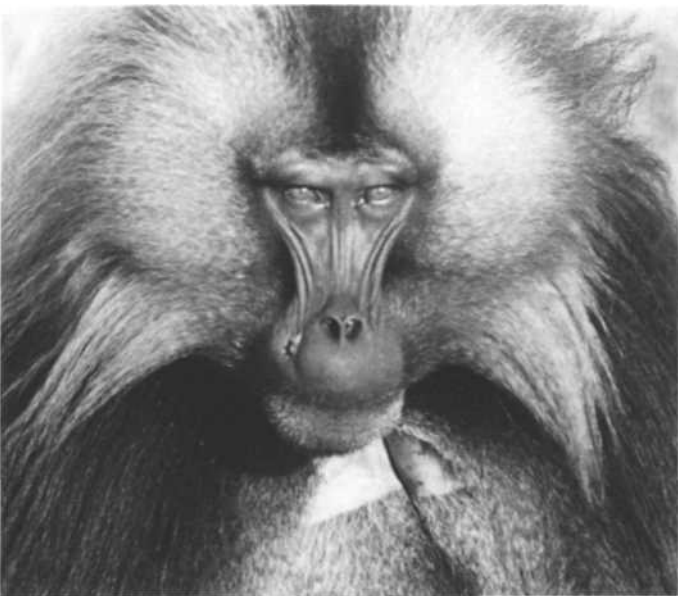
Coastal East Africa

The forests of Coastal East Africa (including the mountains of southeastern Tanzania) (Map 13), show high levels of faunal and floral endemism. This reflects their isolation from the main Guineo-Congolian forest block, an area with which they have had more or less tenuous connections for millions of years. Faunal analysis suggests that these connections to the west have been both via the Tana River and Kenya Highlands in the north, and via the mountains of southern Tanzania in the south. Isolated relics of a once more-widely spread primate fauna still exist in a narrow strip of forest along the coast of Kenya and Tanzania and on the island of Zanzibar, as well as in the forests on the Tana River and the Tanzanian mountains (especially the Uzungwas). All these areas are small and under pressure.

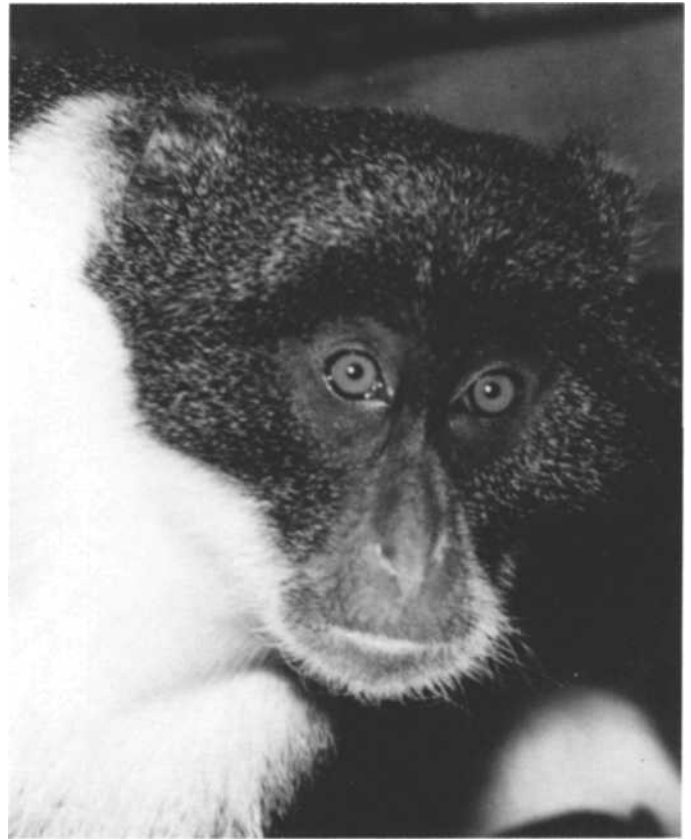
Primates found throughout this region are *Galago zanzibaricus* and *Cercopithecus albogularis*. Other species which occur in some but not all of the forests of the region are *Colobus angolensis palliatus* (including the populations known as *sharppei*), three forms in the *Procolobus badius* superspecies, two forms of *Cercocebus galeritus*, and one or other of the greater galagos (*Galago crassicaudatus* and *G. garnettii*). For more information, see Kingdon (1971).



Part of a gelada band forages on high altitude grassland in Ethiopia. Most of the gelada's diet is made up of the leaf blades, roots and rhizomes of grasses (photo by R. I. M. Dunbar).



An adult male gelada (*Theropithecus gelada*). His muzzle has been wounded in a fight with another male over control of a reproductive unit (photo by R. I. M. Dunbar).



Cercopithecus albogularis albotorquatus, a subspecies of Sykes' monkey restricted to the coastal forests of northern Kenya and southern Somalia (photo by Russell A. Mittermeier).

On the floodplain of Kenya's lower Tana River are many isolated forest patches, some of which support one or more of the following endemic subspecies: *Cercocebus galeritus galeritus*, the *rufomitratu*s form of red colobus, and *Cercopithecus albogularis albotorquatus*. Despite the establishment of a National Reserve in 1976, populations of both the mangabey and, especially, the red colobus have declined and the river's flood regime - crucial to the maintenance of the forests - is being altered by dams on the upper river (see Marsh, 1978, 1985). In the forest strip along the Kenyan coast itself are found *Galago zanzibaricus* and small populations of *Colobus angolensis*. Much of this forest has been very heavily disturbed by agriculture, the development of tourist resorts, and by lumbering. Even the areas enclosed within forest reserves are threatened by encroachment and conversion to plantations.

The *kirkii* species of red colobus monkey is found only on the island of Zanzibar (1,650 km²) off the northern coast of Tanzania. *Galago garnettii*, *G. zanzibaricus* and *Cercopithecus albogularis* also occur on the island. Zanzibar shares some other endemic mammals with the coastal forests, such as the Zanzibar red duiker *Cephalophus adersi* (= *C. natalensis adersi*). Although the population of *Procolobus [badius] kirkii* on Zanzibar is dangerously small (recent estimates suggest about 1,500 individuals), it appears to be stable. However, the forest habitat of *kirkii* is being disturbed and encroached, and occasionally individuals are shot (see Silkiluwasha, 1981, for more information).

The Uzungwa Mountains form an isolated group in south-central Tanzania between the Uluguru Mountains to the north, and the southern highlands bordering Lake Malawi to the south. For a relatively small area, the Uzungwas support a very high diversity of plant and animal species, with many endemics. Here is found the majority of remaining populations of the *gordonorum* form of red colobus (probably numbering less than 5,000 individuals), as well as the recently discovered Sanje mangabey (*Cercocebus galeritus* subsp.) (see Homewood & Rodgers, 1981; Rodgers & Homewood, 1982).

Recommended Conservation Action

General Recommendations

From our review of the communities of African primates, we conclude that if present patterns of diversity are to be maintained, effective conservation measures must be instituted or maintained in each of the five major lowland forest regions, as well as in the six other regions with special primate faunas. Two different kinds of action are needed if effective conservation in these regions is to be achieved:

- (1) SURVEYS are needed in many parts of the areas described above where the distribution and status of primates is still unclear. These surveys should aim to produce recommendations for further conservation action. The highest priority must be given to surveys of areas containing what are believed to be seriously threatened forms. Surveys are the kind of project for which the technical expertise of IUCN/SSC members is especially well suited.
- (2) Where the distribution and status of primates are relatively well known and potential conservation sites have already been identified, support and technical advice should be given that will lead to the ESTABLISHMENT and/or EFFECTIVE MANAGEMENT OF RESERVES. Highest priority should be given to large reserves, or potential reserves, containing several threatened primates and a diversity of other species. In the larger forest regions, more than one reserve will usually be needed if sufficiently large populations of all typical members of that region's community are to be adequately protected. And since no one reserve can ever be regarded as totally secure, we recommend that at least two or, if possible, three reserves be established in each major region. Where feasible, these reserves should be located in different countries in the region. However, in some of the smaller special regions, only a single large reserve may be feasible.

Specific Projects

This final section of the Action Plan identifies specific projects that should be priorities in the 1986-90 period. With each project an estimate of the funds required during this period is given. In many cases the estimates are initial approximations and precise budgets still have to be drawn up. The estimates should, however, give some guidance to funding agencies; they indicate the scale of resources needed and how these resources might be most effectively distributed. For instance, survey projects are relatively inexpensive compared with the cost of establishing and managing a large reserve; they are an obvious and cost-effective use of resources in regions where the status of primate populations are unknown and reserve sites have not been identified. Surveys, however, are not of great value in the long term unless management recommendations which result from them are implemented. Projects to help establish and manage effective reserves must therefore be a major part of a conservation strategy of this type, and must take priority in areas where survey work has already been done.

The following specific projects are listed by region:

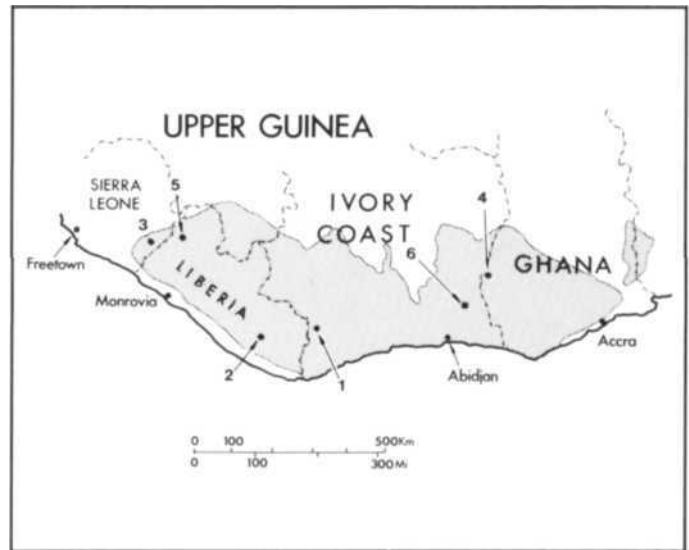
Upper Guinea

1. Conservation of Tai National Park **\$100,000**

This area of 3,000 km² in the southwestern Ivory Coast is the largest and most developed reserve in the Upper Guinea region. It lies at the boundary of the Upper Guinea East and West subregions. As well as supporting populations of all the region's characteristic primates, it also has substantial populations of forest elephant and pygmy hippopotamus. However, although the park is theoretically well protected, this protection does not operate well in practice. There are many farms on the park periphery, much illegal tree cutting and organized hunting is taking place (including hunting of chimpanzees, red colobus monkeys, pygmy hippos, antelopes and elephants), and thousands of people (including gold miners) are reported to be permanently resident in the park. A trained warden is needed to organize patrols and enforce park regulations.

2. Development of Sapo National Park **\$160,000**

Sapo (1,300 km²) was recently established as Liberia's first National Park, but it is completely undeveloped. It contains all the Upper Guinea West primates, with the possible exception of *Cercopithecus nictitans*. Like the Tai N.P., it is an important area for pygmy hippos, forest elephants, and leopards, and it also contains populations of the Jentink's and zebra duikers endemic to the Upper Guinea region. Funds are needed to employ, train and equip staff, to lay out boundaries and patrol routes, and to establish a research station.



Map 3. The Upper Guinea rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

3. Conservation of the Gola Forest **\$150,000**

The Gola is Sierra Leone's last major area of lowland rain forest. Located in the southeast of the country, it supports populations of all the Upper Guinea West primates (with the probable exception of *C. nictitans*), of forest elephants, and of pygmy hippos. Although the remaining parts of the Gola have the status of government Forest Reserves, they are seriously threatened by expanding timber exploitation and hunting. Funds are required to implement management plans currently being prepared and to develop a research station on Tiwai Island on the western edge of the Gola Forest.

4. West Ghana Parks **\$40,000**

Support the Ghana government in efforts to consolidate the Ankasa Game Production Reserve and Nini-Souhien National Park (in the evergreen rain-forest zone of western Ghana) into a single National Park (total area 505 km²), and encourage better protection and consolidation of the Bia National Park and Bia Game Production Reserve in the moist deciduous zone (combined area 302 km²). These forests contain all members of the Upper Guinea East primate community.

5. Survey of Lofa-Mano, Liberia **\$25,000**

The Lofa-Mano area of western Liberia, on the Sierra Leone border, has been proposed as a national park. Assess wildlife populations and management needs. There is much untouched forest in this area, which is floristically different from Sapo, but is threatened by logging and alluvial mining activities.

6. Survey of eastern and central Ivory Coast **\$25,000**

Survey needed to identify a site or sites for primate conservation. Both *Cercopithecus diana roloway* and *Cercocebus atys lunulatus* occur here, and both need better protection. Combine survey with study of the important faunal transition zone in the vicinity of the Sassandra Rivers, where hybridization between several primate populations has been reported.

Cameroon Region

7. Development of Korup National Park, Cameroon \$150,000

This is the most significant conservation area (1,250 km²) in the region, and the only site definitely known to support viable populations of the *preussi* form of red colobus and of *Mandrillus leucophaeus*. Other primates in the park include *Cercocebus torquatus*, *Cercopithecus nictitans martini*, *C. erythrotis camerunensis*, *C. mona*, *C. pogonias pogonias*, *Pan troglodytes*, several prosimians, and probably *Cercopithecus preussi*. Resettlement of villagers currently resident within the park, or their enclavement in controlled areas, is a priority, as are construction of a park headquarters and the development of a trail system and tourist facilities.

8. Oban Hills Survey \$25,000

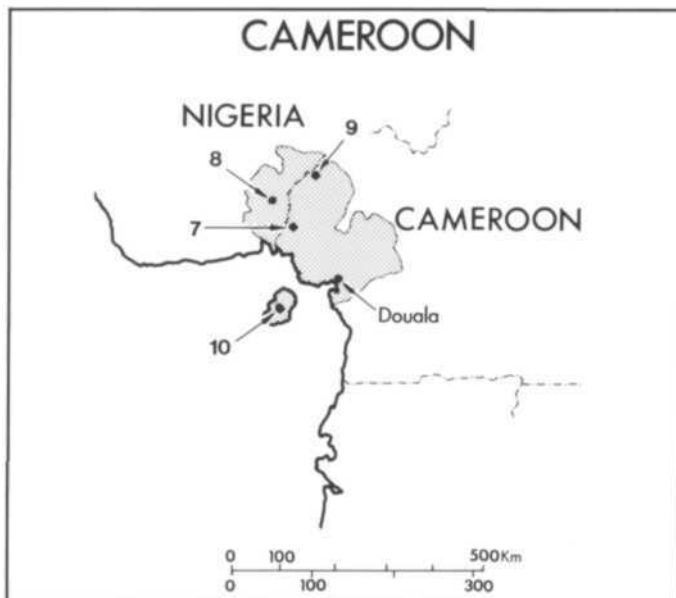
Survey the Oban Group of Forest Reserves in the southeast of Nigeria, adjacent to the Cameroon border. This area has a similar fauna and flora to the Korup area, but has been given little attention. It is threatened by timber exploitation and hunting. Populations of the *preussi* form of red colobus and *Mandrillus leucophaeus* may survive here, and if so this could be an important secondary reserve. A National Park has already been proposed, but no action has been taken on the proposal.

9. Mamfe-Obudu Survey \$30,000

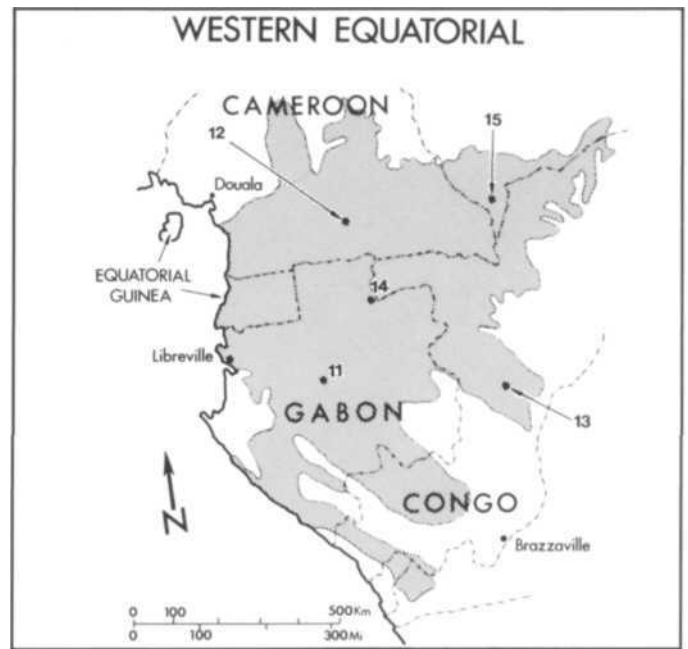
Survey the forest area between Mamfe, Cameroon, and Obudu, Nigeria, with emphasis on the Takamanda Reserve, Cameroon. This area is significant as a habitat for both *Cercopithecus preussi* and *Gorilla gorilla* (possibly an undescribed western highland form). Gorillas still occur in the area, but hunting pressure is intense. The area includes patches of Cameroon Highland montane vegetation, supporting many endemic plants and animals, many of them still undescribed. There is a long-standing proposal for a National Park on the Nigerian side, and also for upgrading the Takamanda Reserve in Cameroon, but the whole area remains poorly known, and access is extremely difficult. A survey might be combined with a survey of primate populations on Mt. Cameroon itself.

10. Bioko \$20,000

Survey remaining forest areas of Bioko (Fernando Po), Equatorial Guinea, concentrating on Santa Isabel peak, the Caldera of San Carlos and the area between the Caldera and Ureka. Make recommendations for primate conservation. Economic conditions in Equatorial Guinea are likely to put serious practical difficulties in the way of a survey, and to hamper the implementation of any conservation proposals. However, the tremendous biological significance of the island is a sufficient reason for at least attempting a survey.



Map 4. The Cameroon rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).



Map 5. The Western Equatorial rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

Western Equatorial Region

11. Development of Lope Reserve, Gabon \$120,000

The Lope is a large area (5,000 km²) of mostly virgin rain forest, supporting important populations of *Gorilla gorilla*, *Pan troglodytes*, *Mandrillus sphinx*, *Colobus satanas* and *Arctocebus calabarensis*. Should be upgraded to National Park, and existing timbering permits revoked. Major primate research in progress is aiding conservation efforts and should be further supported. Study feasibility of extending the reserve east across the Offoué River into the Forêt des Abeilles, home of a newly discovered population of monkeys in the *Cercopithecus lhoesti-preussi* group. This will require further survey work.

12. Dja Survey \$50,000

Surveys in, and development of, the proposed Dja National Park in southern Cameroon. A large (approx. 4,000 km²) area that is largely unexploited, although coffee and cocoa plantations exist in the northern sector. The rich fauna and flora represent a transition between the coastal and Congo Basin communities. Most of the typical elements of the Western Equatorial primate community are present, including a population of western gorillas.

13. Survey of the Republic of Congo \$50,000

Survey should give particular attention to the status of the *bouvieri* form of red colobus, of *Allenopithecus nigroviridis*, and of *Gorilla gorilla*, as well as to the Odzala National Park.

14. Northeastern Gabon \$30,000

Develop plans for a reserve in northeast Gabon, near the Cameroon-Congo border. This is part of a very large area of apparently intact forest, hard of access. Among primates found here are *Gorilla gorilla*, *Pan troglodytes*, *Cercocebus galeritus* and *Mandrillus sphinx*. The area seems to be relatively safe at present, but there are potential threats from mining and the building of a railway to Belinga. Some general surveys of the area have already been made, but the best location and dimensions of a reserve have yet to be established. This should be done before major development of the area commences. Further surveys are also needed in the southwest of Gabon.

15. Central African Republic \$25,000

Assist development of a lowland gorilla reserve in the far south of the Central African Republic. This area is ecologically very similar to those considered in nos. 12 and 14 above, but a well-protected area in a third country would be valuable.



Map 6. The Congo Basin rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

Congo Basin

16. Lomako Forest, Zaire \$50,000

Development of a reserve in the Lomako Forest area, which contains a major *Pan paniscus* population. *Cercocebus aterrimus* and *Allenopithecus nigroviridis* also occur here.

17. Survey of Wamba area, Zaire \$50,000

Investigate the status of *Cercopithecus salongo* and establish the best location for a second *Pan paniscus* reserve. This area has a higher population density of *P. paniscus* than Lomako, but development is intensifying and bonobos are shot for food. Conservation measures are urgently needed.

18. Survey of Salonga National Park, Zaire \$40,000

This park, on the Lomela, Salonga and Momboyo Rivers is very poorly known and seems to have little effective protection. Assess the fauna and conservation needs. *P. paniscus* may be present.

19. Lukenie-Sankuru, Zaire \$25,000

Survey of Lukenie-Sankuru area to assess the status of *Cercocebus galeritus chrysogaster* and make recommendations for its conservation.

20. Northeastern Angola \$25,000

Survey of northeastern Angola and adjacent area of southwestern Zaire to assess the status of *Cercocebus aterrimus opdenboschi*, *Cercopithecus ascanius atrinatus*, *Cercopithecus neglectus*, *Miopithecus talapoin* and *Colobus angolensis angolensis*, and make recommendations for their conservation.

Eastern Zaire

21. Ituri Forest Survey \$50,000

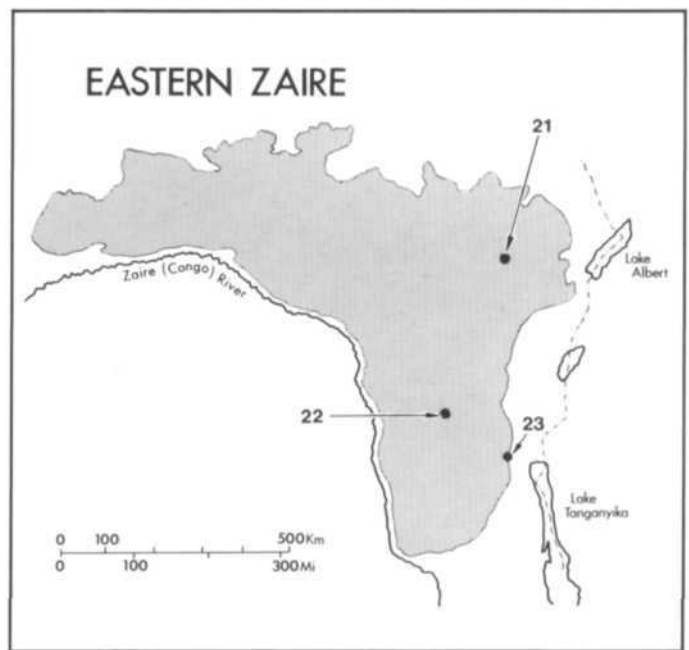
Survey to assess the distribution and status of members of the Ituri Forest primate community and make conservation recommendations. Particular attention should be focused on *Cercopithecus hamlyni* and *C. lhoesti* and on a comparison of primate populations in the different forest types of the region. A primate field study program here should be encouraged.

22. Maiko Survey \$30,000

Survey the Maiko National Park and N. Walikali/W. Lutunguru areas to the south of the Ituri. This huge area has not been explored biologically, but it is believed to support a population of eastern lowland gorillas. Develop management recommendations.

23. Kahuzi-Biega Conservation \$20,000

Improve protection of the Kahuzi-Biega National Park. A major conservation area for eastern lowland gorillas, threatened by hunting and wood cutting. Tourist program requires restructuring to lessen disturbance to gorillas.

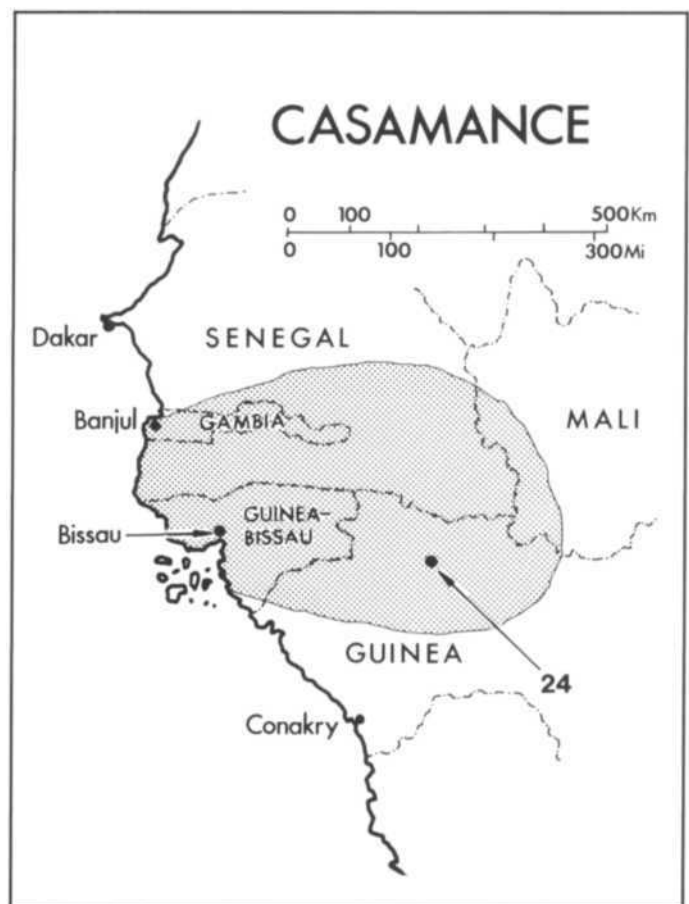


Map 7. The Eastern Zaire rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

Casamance and Fouta Djallon

24. Survey of the Republic of Guinea \$60,000

Survey primate populations and develop reserves to protect major populations of *Papio papio*, the *temminckii* form of red colobus and *Pan troglodytes verus*.

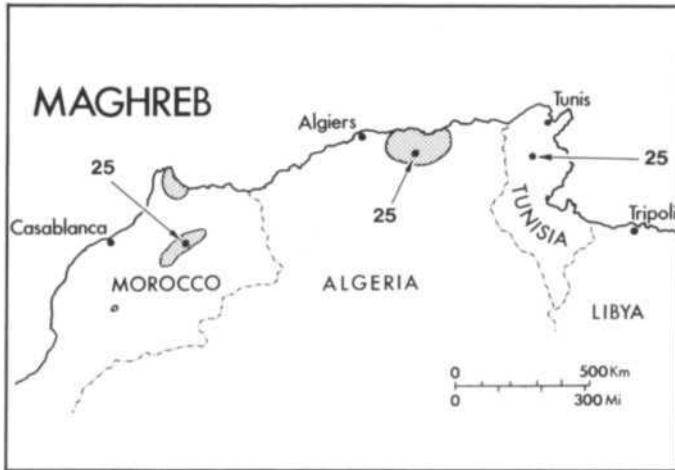


Map 8. The Casamance woodland region (shaded). Project 24 is a survey of the Republic of Guinea (map by Stephen Nash).

Maghreb

25. Barbary Macaque Conservation \$60,000

Promote conservation of *Macaca sylvanus*, by supporting the establishment of a national park system in Morocco and reinforcing the existing park system in Algeria. Combine with research on the impact of overgrazing, logging and hunting on *Macaca sylvanus* populations in all North African habitats, and study feasibility of reintroducing macaques to Tunisian forests.



Map 9. The Maghreb, showing the distribution of the Barbary macaque (shaded) (map by Stephen Nash).

Southern Nigeria

26. Management of Okomu Forest \$60,000

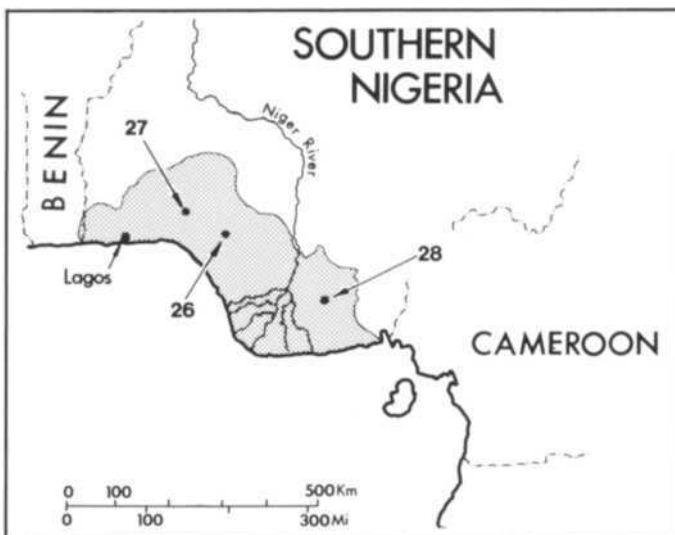
Assist establishment of a wildlife sanctuary in the Okomu Forest Reserve (1,200 km²) in Bendel State. Okomu contains a major population of *Cercopithecus erythrogaster*, together with a wide variety of other southwest Nigerian plants and animals, including *Cercocebus torquatus* and *Cercopithecus nictitans stampflii*. A management study is required.

27. Ondo and Ogun Survey \$20,000

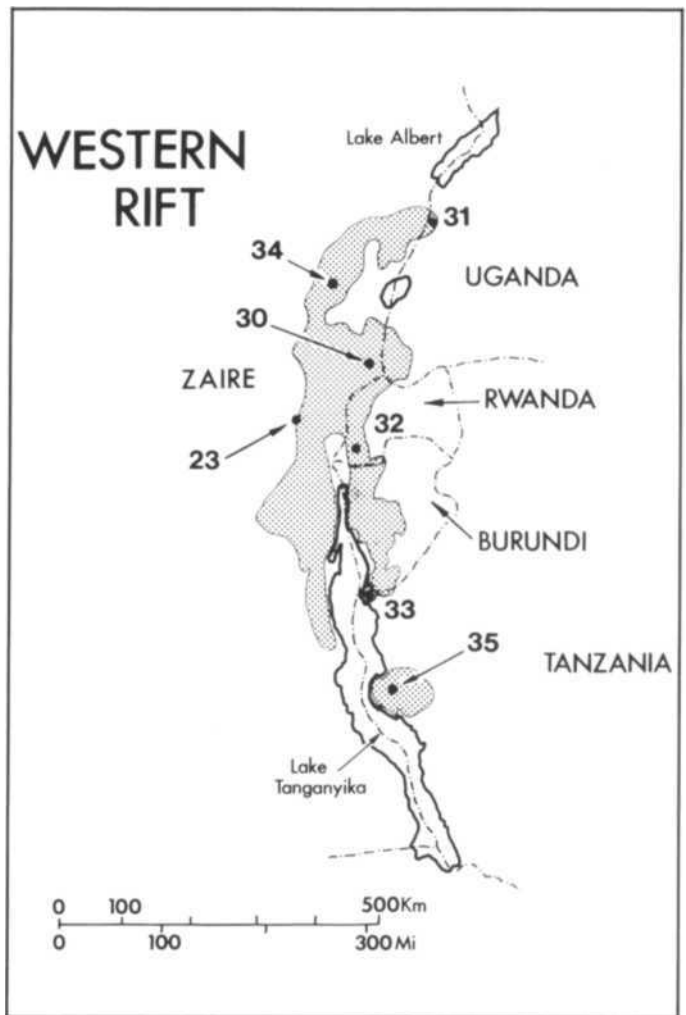
Survey forests of Ondo and Ogun States to investigate status of *C. erythrogaster* and other primates; prepare management recommendations.

28. Niger-Cross Survey \$20,000

Survey of area between Niger and Cross Rivers to investigate the distribution and status of *Cercopithecus sclateri*. Make recommendations for conservation. Include consideration of better protection for relic populations of *Procolobus verus*.



Map 10. The southern Nigerian rain forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).



Map 11. The Western Rift forest region (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

Western Rift

29. Bwindi Forest Conservation \$100,000

Support more effective conservation of the Bwindi Forest, Uganda, which should include the establishment of a series of nature reserves or a national park and the extension of boundaries. A research station is needed.

30. Virunga Volcanoes \$100,000

Improve protection of the Virunga conservation area, especially to give better protection to the Ugandan and Zairois sections, and to allow more effective action to be taken against trappers and hunters in the area as a whole. Continue support for the mountain gorilla project in Rwanda. Investigate status of *Cercopithecus mitis* (apparently both *kandti* and *doggetti* are present).

31. Kibale Forest Conservation \$100,000

Increase the effectiveness of conservation measures in the Kibale Forest Reserve, Uganda, and continue ecological and management studies on the primate community, studies that have been in progress since 1970. This project should include a campaign to upgrade the conservation status of Kibale.

32. Nyungwe-Kibira Conservation \$100,000

Support surveys and conservation work in the Nyungwe-Kibira Forest. Nyungwe (in Rwanda) currently has the status of a Forest Reserve, whose degree of exploitation has yet to be determined. Kibira (in Burundi) is a National Park, but at present gets little active protection and is threatened by tree-felling and grazing. Efforts must be made to increase the legal protection in Nyungwe; to survey Kibira, especially to determine whether the *tephrosceles* form of red colobus is present; and to improve protection of Kibira.

33. Gombe Stream National Park \$60,000

Assist the continued monitoring of Gombe Stream National Park (Tanzania) and its chimpanzee population. Although Gombe is small and has a low diversity of primate species, research there has had a very important role in promoting a wider knowledge of primate behavior. Gombe has great significance as a site providing long-term data on an ape population.

34. Western Rift of Zaire \$50,000

Survey forests at mid-elevations (1,200-1,300 m) along the W. Rift Highlands in Zaire from Beni south to the Bujumbura area. Forests and wildlife are fast disappearing. Assess needs for protection.

35. Mahale Mountains Park Management \$30,000

Assist development and management of Mahale Mountains National Park (Tanzania). Establishment of more effective anti-poaching patrols are a priority.



Map 12. The Ethiopian Highlands (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

Ethiopian Highlands

36. Simen Mountains Conservation \$50,000

Help provide better protection for the Simen Mountains National Park, which is the only officially, protected area in which *Theropithecus gelada* occurs. Conservation is minimal at present. This park also contains *Colobus guereza guereza* and the last population of the Walia ibex (*Capra ibex*), and is used by some *Papio hamadryas* groups in the wet season.

37. Bale Mountains \$25,000

Assess the feasibility of translocating gelada breeding groups to the proposed Bale Mountains National Park (south of Addis Ababa), where a study of the rare mountain nyala antelope is in progress. *C. guereza guereza* also occurs here. Work for better protection of the park.

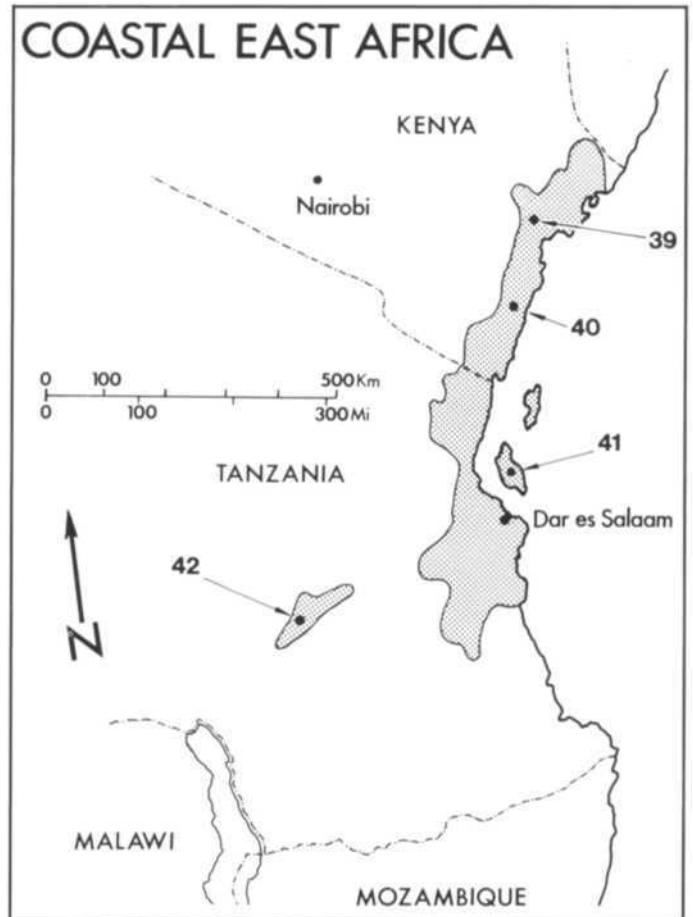
38. Harrar Survey \$25,000

Survey of Harrar district to the east of the high plateau to locate additional conservation areas for *Papio hamadryas* and *Colobus guereza gallarum*. Many hamadryas groups in the Awash National Park are hybrids.

Coastal East Africa

39. Tana River Research \$65,000

Establish a research station in Tana River National Reserve. Monitor population trends in Tana River red colobus and mangabey (which declined in the 1975-83 period) and assess forest regeneration.



Map 13. The forests of Coastal East Africa and the Uzungwa Mountains (shaded) showing location of recommended projects, numbered as in text (map by Stephen Nash).

40. Kenya Coast Survey \$15,000

Survey remaining areas of Kenyan coastal forest, especially Boni and Arabuko-Sokoke, and make management recommendations.

41. Zanzibar Conservation \$20,000

To safeguard the future of red colobus populations on Zanzibar, increase area protected by Jozani Forest Reserve and upgrade its status to National Park, give better protection to the Muyuni coastal forest strip and Uzi Island, and monitor translocated populations.

42. Uzungwa Mountains, Tanzania \$40,000

To improve protection of the Uzungwa Mountains and their endemic red colobus and mangabey populations, support plans to gazette West Kilombero, Mwanihana and Uzungwa Scarp forests as a National Park and assist management efforts in the park; assist management of the Magombera area incorporated into the Selous Game Reserve; support continuing research on the primate community, including surveys on the southern slopes.

Project Priorities

Although all these projects are needed, some have a higher priority than others because they involve large numbers of seriously threatened forms and/or a seriously threatened area supporting many primate species or several endemics. These priorities have been quantified by rating projects on the following parameters:

- A. Number of species in project area with a high conservation priority rating (a rating of 9-7 overall, or a threat rating of at least 3). Scored on 1 to 4 scale, as follows:
 1. 1-2 high priority species
 2. 3-4 high priority species
 3. 5-6 high priority species
 4. 7-8 high priority species

B. Imminence of threat to the ecosystem under consideration, also scored on a 1 to 4 scale:

1. Low degree of threat at present
2. Moderately threatened
3. Highly threatened (e.g., larger in size, but still under serious threat from conversion and/or hunting)
4. Very highly threatened (e.g., small in size and subject to major erosion or conversion in the near future and/or very heavy hunting pressure)

C. Overall primate species diversity in project area, rated on a 1 to 3 scale:

1. 5 or fewer species
2. 6-9 species
3. 10 or more species

D. Number of endemic primate forms in the project area (species or subspecies found only in the region of which the project area is a typical part). Rated on a 1 to 3 scale:

1. 1 or 2 endemic subspecies in the area
2. 1 endemic species, or more than 2 endemic subspecies
3. 2 or more endemic species in the area

Tables 3 and 4 present the results this project rating in two groups: (1) Surveys and (2) Projects to Develop and Manage Identified Conservation Areas. These two kinds of project generally required significantly different commitments of time, personnel and money, and should probably be considered in somewhat different ways by funding agencies.

As with species conservation priority ratings, it should be borne in mind that these ratings are inevitably somewhat arbitrary, are based only on information available to the compiler (which is often incomplete), and are provided as only a general guide to the relative significance of different areas.

Table 3
Priority Ratings of Surveys Required in Africa to Identify Conservation Needs and Potential Reserve Areas

Project # and Area (Details in text)	#High Priority Species	Imminence of Threat to Area	Primate Species Diversity	- Endemic Primates in Area	Total Rating
5. Lofa-Mano area, Liberia	3	3	3	2	11
6. East & Centra! Ivory Coast	3	4	3	2	12
8. Oban Forests, E. Nigeria	3	3	3	3	12
9. Mamfe (Cameroon) to Obudu (Nigeria)	4	3	3	3	13
10. Bioko. Equatorial Guinea	3	4	3	3	13
13. Republic of Congo	4	2	3	3	12
17. Wamba area, Zaire	3		3	3	11
18. Salonga National Park, Zaire	2?	2	3?	3	9
19. Lukenie-Sankuru area, Zaire		1			
20. Northeast Angola	2?	1?	3?	3?	9
21. Ituri Forest, Zaire	2	3	2	2	9
22. Maiko National Park, Zaire	3	1	3	3	10
24. Guinea	2	3		2	9
27. Ondo and Ogun. Nigeria	2	4	2	2	10
28. Niger-Cross Interfluvium, Nigeria	2	4		2	10
34. Western Rift of E. Zaire	2		2	1	9
38. Harrar area, Ethiopia	1	2	2	2	7
40. Kenya coastal forests	1	3	1	3	8

Table 4
Priority Ratings of Reserve Development and Management Projects for African Primate Conservation

Project # and Area	#High Priority Species in Area	Imminence of Threat to Area	Primate Species Diversity in Area	# Endemic Primates in Area	Total Rating
1. Tai National Park. Ivory Coast	3	3	3	2	11
2. Sapo National Park. Liberia	3	2	3	2	10
3. Gola Forest, Sierra Leone	3	2	3	2	10
4. West Ghana Parks	3	2	3	2	10
7. Korup National Park, Cameroon	3	1	3	3	10
11. Lopé Reserve, Gabon	3	1	3	3	10
12. Dja National Park. Cameroon	4?	1	3	3	11
14. Northeast Gabon	3	1	3	3	10
15. Southern Central Africa Republic	3	1	3	3	10
16. Lomako Forest. Central Zaire	3	2	3	3	11
23. Kahuzi-Biega. E. Zaire	3	2	2	2	9
25. Maghreb	1	3	1	2	7
26. Okumu Forest Reserve, Nigeria	2	4	2	2	10
29. Bwindi Forest Reserve, Uganda	2	4	3	2	11
30. Virunga Volcanoes	1	4	1	1	7
31. Kibale Forest Reserve. W. Uganda	2	3	3	2	10
32. Nyungwe-Kibira Forest. Rwanda and Burundi	2	2	3	1	8
33. Gombe Stream National Park. Tanzania	1	1	2	1	5
35. Mahale Mountains. Tanzania	1	1	2	1	5
36. Simen Mountains National Park	1	2	1	3	7
37. Bale Mountains National Park, Ethiopia	1	2	1	3a	7
39. Tana River National Reserve, Kenya	2	4	3	2	11
41. Zanzibar Forests, Tanzania	1	2	1	3	7
42. Uzungwa Mountains. Tanzania	2	2	2	3	9

a: If *Theropithecus gelada* introduced.



Many populations of the *guereza* form of black-and-white colobus monkey (*Colobus guereza*) have been decimated by hunting for their skins which are used for rugs, coats and other decorative purposes. (Photo by John F. Oates)

Conclusion

The total estimated cost of all the projects listed here is \$2,290,000 (see Table 5). Action must be taken on all these projects if we are to ensure that the current diversity of African primates survives into the next century. However, projects identified as having the highest priority ratings should be given particular attention and initiated at the earliest possible opportunity.

In Table 3 the survey projects with the highest priority (total rating 10-13) are in these areas:

Between Mamfe, Cameroon, and Obudu, Nigeria
 Bioko (Fernando Po), Equatorial Guinea
 East and Central Ivory Coast
 Oban Forests, Nigeria
 Republic of Congo
 Lofa-Mano area, Liberia
 Wamba area, Zaire
 Ituri Forest, Zaire
 Maiko National Park, Zaire
 Ondo and Ogun States, Nigeria
 Niger-Cross Interfluvium, Nigeria

In Table 4, the reserve development and/or management projects with the highest priority (total rating 10-11) are as follows:

Tai National Park, Ivory Coast
 Dja National Park, Cameroon

Lomako Forest, Zaire
 Bwindi Forest Reserve, Uganda
 Tana River National Reserve, Kenya
 Sapo National Park, Liberia
 Gola Forest, Sierra Leone
 West Ghana Parks
 Korup National Park, Cameroon
 Lope Reserve, Gabon
 Northeast Gabon
 Southern Central African Republic
 Okomu Forest Reserve, Nigeria
 Kibale Forest Reserve, Uganda

Long term field research projects have proved to be particularly effective in Africa as a focus of primate conservation efforts at a number of sites. We strongly recommend the continued or increased support of such projects in these high priority areas. The development of project base camps and study sites into field stations affiliated with local organizations (such as universities or wildlife conservation departments) should be particularly encouraged. These stations can serve a very valuable role in both research and training, leading to more effective management of the local ecosystem. However, these stations must as far as possible be constructed and run in such a way that they do not require frequent inputs of large amounts of money or the frequent servicing and repair of sophisticated equipment. Local resources of materials and expertise should be used wherever possible.

Table 5
Summary of Funding Requirements for 1986-1990

Major Lowland Rain Forest Regions

Other Special Communities

Upper Guinea		Casamance and Fouta Djalon	
1. Conservation of Tai National Park	\$100,000	24. Survey of the Republic of Guinea	\$ 60,000
2. Development of Sapo National Park	160,000	SUBTOTAL	\$ 60,000
3. Conservation of the Gola Forest	150,000	<hr/>	
4. West Ghana Parks	40,000	Maghreb	
5. Survey of Lofa-Mano, Liberia	25,000	25. Barbary Macaque Conservation	\$ 60,000
6. Survey of eastern and central Ivory Coast	25,000	SUBTOTAL	\$ 60,000
SUBTOTAL	\$500,000	<hr/>	
Cameroon Region		Southern Nigeria	
7. Development of Korup National Park, Cameroon	\$150,000	26. Management of Okumu Forest	\$ 60,000
8. Oban Hills Survey	25,000	27. Ondo and Ogun Survey	20,000
9. Mamfe-Obudu Survey	30,000	28. Niger-Cross Survey	20,000
10. Bioko	20,000	SUBTOTAL	\$100,000
SUBTOTAL	\$225,000	<hr/>	
Western Equatorial Region		Western Rift	
11. Development of Lope Reserve, Gabon	\$120,000	29. Bwindi (Impenetrable) Forest Conservation	\$100,000
12. Dja Survey	50,000	30. Virunga Volcanoes	100,000
13. Survey of the Republic of Congo	50,000	31. Kibale Forest Conservation	100,000
14. Northeastern Gabon	30,000	32. Nyungwe-Kibira Conservation	100,000
15. Central African Republic	25,000	33. Gombe Stream National Park	60,000
SUBTOTAL	\$275,000	34. Western Rift of Zaire	50,000
<hr/>		35. Mahale Mountain Park Management	30,000
Congo Basin		SUBTOTAL	\$540,000
16. Lomako Forest, Zaire	\$ 50,000	<hr/>	
17. Survey of Wamba area, Zaire	50,000	Ethiopian Highlands	
18. Survey of the Salonga National Park, Zaire	40,000	36. Simen Mountains Conservation	\$ 50,000
19. Lukenie-Sankuru, Zaire	25,000	37. Bale Mountains	25,000
20. Northeastern Angola	25,000	38. Harrar Survey	25,000
SUBTOTAL	\$190,000	SUBTOTAL	\$100,000
<hr/>		<hr/>	
Eastern Zaire		Coastal East Africa	
21. Ituri Forest Survey	\$ 50,000	39. Tana River Research	\$ 65,000
22. Maiko Survey	30,000	40. Kenya Coast Survey	15,000
23. Kahuzi-Biega Conservation	20,000	41. Zanzibar Conservation	20,000
SUBTOTAL	\$100,000	42. Uzungwa Mountains, Tanzania	40,000
<hr/>		SUBTOTAL	\$140,000
TOTAL: MAJOR LOWLAND RAIN FOREST REGIONS	\$1,290,000	TOTAL: OTHER SPECIAL COMMUNITIES	\$1,000,000
<hr/>		TOTAL: ALL OF AFRICA, 1986-1990	\$2,290,000

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Appendix 1

Species Lists for African Countries Containing Ten or More Primate Species

Several factors obviously affect primate species diversity in a single country. Of these, the most important are land area, extent of rain-forest cover, and the number of different regional primate communities contained within the country's boundaries. Zaire, with the longest species list, is very large, supports large areas of rain forest, and contains members of both the savanna community and of four different forest communities: Congo Basin, Eastern Zaire, Western Rift and Western Equatorial (the small Mayombe Forest area north of the River Congo in the west). However, Cameroon, although only one-fifth the size of Zaire, has almost as many primate species. Within its boundaries Cameroon contains the savanna community and two species-rich forest communities (Cameroon and Western Equatorial). Equatorial Guinea is only about one-hundredth the size of Zaire, but still has 21 species; each of its two widely separated components (Bioko and Rio Muni) falls within a different primate community. These examples indicate why we should devote our attention to distinct regional communities rather than to political entities when planning conservation efforts.

Where species in the following list are shown with a query in parentheses we have not been able to locate a reliable published record or museum specimen from the country in question, but the species is expected to be present on biogeographic grounds; or the existence of the species is otherwise in doubt (e.g., *Cercopithecus salongo*).

Endemic species, definitely known only from a single country, are indicated with an asterisk (*). The only countries with fewer than 10 species that contain a species not included in this list are Morocco and Algeria, with their single species, the Barbary macaque (*Macaca sylvanus*).

Zaire 2,345,000 km², 30-32 species

Family Lorisidae

Subfamily Lorisinae

Arctocebus calabarensis ? (Mayombe area)

Perodicticus potto

Subfamily Galaginae

Galago demidovii

Galago inustus

Galago senegalensis

Galago thomasi

Galago elegantulus

Galago crassicaudatus

Family Cercopithecoidea

Subfamily Cercopithecoidea

Cercocebus galeritus

Cercocebus albigena

Cercocebus aterrimus

Papio anubis

Papio cynocephalus

**Cercopithecus salongo* ?

Cercopithecus neglectus

**Cercopithecus hamlyni*

Cercopithecus lhoesti

Cercopithecus mitis

Cercopithecus nictitans

Cercopithecus cephus (Mayombe area)

Cercopithecus ascanius

Cercopithecus pogonias

Cercopithecus aethiops

Miopithecus talapoin

Allenopithecus nigroviridis

Erythrocebus patas

Subfamily Colobinae

Procolobus [badius] rufomitratu

Colobus guereza

Colobus angolensis

Family Pongidae

Pan troglodytes

**Pan paniscus*

Gorilla gorilla

Cameroon

475,000 km², 29 species

Family Lorisidae

Subfamily Lorisinae

Arctocebus calabarensis

Perodicticus potto

Subfamily Galaginae

Galago alleni

Galago demidovii

Galago senegalensis

Galago thomasi

Galago elegantulus

Family Cercopithecoidea

Subfamily Cercopithecoidea

Cercocebus torquatus

Cercocebus galeritus

Cercocebus albigena

Papio anubis

Mandrillus sphinx

Mandrillus leucophaeus

Cercopithecus neglectus

Cercopithecus preussi

Cercopithecus nictitans

Cercopithecus erythrotis

Cercopithecus cephus

Cercopithecus ascanius

Cercopithecus mona

Cercopithecus pogonias

Cercopithecus aethiops

Miopithecus sp.

Erythrocebus patas

Subfamily Colobinae

Procolobus [badius] pennanti

Colobus guereza

Colobus satanas

Family Pongidae

Pan troglodytes

Gorilla gorilla

Nigeria

924,000 km², 20-24 species

Family Lorisidae

Subfamily Lorisinae

Arctocebus calabarensis

Perodicticus potto

Subfamily Galaginae

Galago alleni

Galago demidovii

Galago senegalensis

Galago elegantulus

Family Cercopithecoidea

Subfamily Cercopithecoidea

Cercocebus torquatus

Papio anubis

Mandrillus leucophaeus

Cercopithecus preussi

Cercopithecus nictitans

**Cercopithecus erythrogaster*

**Cercopithecus sclateri*

Cercopithecus erythrotis

Cercopithecus mona

(*Cercopithecus pogonias*?)

Cercopithecus aethiops

Erythrocebus patas

Subfamily Colobinae

(*Procolobus [badius] pennanti*?)

Procolobus verus

Colobus vellerosus

Colobus guereza

Family Pongidae

Pan troglodytes

Gorilla gorilla

Equatorial Guinea 28,000 km², 21 species

(includes Bioko Island)

- Family Lorisidae
 - Subfamily Lorisinae
 - Arctocebus calabarensis*
 - Perodicticus potto*
 - Subfamily Galaginae
 - Galago alleni*
 - Galago demidovii*
 - Galago elegantulus*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus torquatus*
 - Cercocebus galeritus*
 - Cercocebus albigena*
 - Mandrillus sphinx*
 - Mandrillus leucophaeus*
 - Cercopithecus neglectus*
 - Cercopithecus preussi*
 - Cercopithecus nictitans*
 - Cercopithecus erythrotis*
 - Cercopithecus cephus*
 - Cercopithecus pogonias*
 - Miopithecus* sp.
 - Subfamily Colobinae
 - Procolobus [badius] pennanti*
 - Colobus satanas*
- Family Pongidae
 - Pan troglodytes*
 - Gorilla gorilla*

Congo Republic 342,000 km², 22 species

- Family Lorisidae
 - Subfamily Lorisinae
 - Arctocebus calabarensis*
 - Perodicticus potto*
 - Subfamily Galaginae
 - Galago alleni*
 - Galago demidovii*
 - Galago elegantulus*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus torquatus*
 - Cercocebus galeritus*
 - Cercocebus albigena*
 - Papio anubis*
 - Mandrillus sphinx*
 - Cercopithecus neglectus*
 - Cercopithecus nictitans*
 - Cercopithecus cephus*
 - Cercopithecus pogonias*
 - Cercopithecus aethiops*
 - Miopithecus* sp.
 - Allenopithecus nigroviridis*
 - Subfamily Colobinae
 - Procolobus [badius] pennanti*
 - Colobus guereza*
 - Colobus satanas*
- Family Pongidae
 - Pan troglodytes*
 - Gorilla gorilla*

Central African Republic 623,000 km², 19-20 species

- Family Lorisidae
 - Subfamily Lorisinae
 - Arctocebus calabarensis* ?
 - Perodicticus potto*
 - Subfamily Galaginae
 - Galago alleni*
 - Galago demidovii*
 - Galago senegalensis*
 - Galago elegantulus*

- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus galeritus*
 - Cercocebus albigena*
 - Papio anubis*
 - Cercopithecus neglectus*
 - Cercopithecus nictitans*
 - Cercopithecus cephus*
 - Cercopithecus ascanius*
 - Cercopithecus pogonias*
 - Cercopithecus aethiops*
 - Erythrocebus patas*
 - Subfamily Colobinae
 - Colobus guereza*
 - Procolobus [badius] rufomitratu*
- Family Pongidae
 - Pan troglodytes*
 - Gorilla gorilla*

Tanzania 945,000 km², 19-20 species

- Family Lorisidae
 - Subfamily Galaginae
 - Galago demidovii*
 - Galago senegalensis*
 - (Galago thomasi ?)*
 - Galago zanzibaricus*
 - Galago crassicaudatus*
 - Galago garnettii*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus galeritus*
 - Papio anubis*
 - Papio cynocephalus*
 - Cercopithecus mitis*
 - Cercopithecus albogularis*
 - Cercopithecus ascanius*
 - Cercopithecus aethiops*
 - Erythrocebus patas*
 - Subfamily Colobinae
 - Procolobus [badius] rufomitratu*
 - *Procolobus [badius] kirkii*
 - *Procolobus [badius] gordonorum*
 - Colobus guereza*
 - Colobus angolensis*
- Family Pongidae
 - Pan troglodytes*

Gabon 265,000 km², 19 species

- Family Lorisidae
 - Subfamily Lorisinae
 - Arctocebus calabarensis*
 - Perodicticus potto*
 - Subfamily Galaginae
 - Galago alleni*
 - Galago demidovii*
 - Galago elegantulus*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus torquatus*
 - Cercocebus galeritus*
 - Cercocebus albigena*
 - Mandrillus sphinx*
 - Cercopithecus neglectus*
 - *Cercopithecus ?* sp. (related to *C. lhoesti*)
 - Cercopithecus nictitans*
 - Cercopithecus cephus*
 - Cercopithecus pogonias*
 - Miopithecus* sp.
 - Subfamily Colobinae
 - Colobus guereza*
 - Colobus satanas*
- Family Pongidae
 - Pan troglodytes*
 - Gorilla gorilla*

Uganda 236,000 km², 19 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago inustus
Galago senegalensis
Galago crassicaudatus
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus albigena
Papio anubis
Cercopithecus neglectus
Cercopithecus lhoesti
Cercopithecus mitis
Cercopithecus ascanius
Cercopithecus pogonias
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Procolobus [badius] rufomitratus
Colobus guereza
Colobus angolensis
Family Pongidae
Pan troglodytes
Gorilla gorilla

Angola (including Cabinda) 1,247,000 km², 17-18 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Galago thomasi
(*Galago elegantulus* ?) (Cabinda)
Galago crassicaudatus
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus atterimus
Papio cynocephalus
Papio ursinus
Cercopithecus neglectus
Cercopithecus mitis
Cercopithecus nictitans
Cercopithecus cephus
Cercopithecus ascanius
Cercopithecus aethiops
Miopithecus talapoin
Subfamily Colobinae
Colobus angolensis
Family Pongidae
Gorilla gorilla

Ivory Coast 322,000 km², 17 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus atys
Cercocebus torquatus
Papio anubis
Cercopithecus diana
Cercopithecus nictitans
Cercopithecus petaurista
Cercopithecus campbelli
Cercopithecus aethiops
Erythrocebus patas

Subfamily Colobinae
Procolobus [badius] badius
Procolobus verus
Colobus polykomos
Colobus vellerosus
Family Pongidae
Pan troglodytes

Kenya 583,000 km², 17 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago senegalensis
Galago zanzibaricus
Galago crassicaudatus
Galago garnettii
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus galeritus
Papio anubis
Papio cynocephalus
Cercopithecus neglectus
Cercopithecus albogularis
Cercopithecus mitis
Cercopithecus ascanius
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Procolobus [badius] rufomitratus
Colobus guereza
Colobus angolensis

Ghana 239,000 km², 15 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus torquatus
Papio anubis
Cercopithecus diana
Cercopithecus petaurista
Cercopithecus campbelli
Cercopithecus mona
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Procolobus [badius] badius
Procolobus verus
Colobus vellerosus
Family Pongidae
Pan troglodytes

Sierra Leone 72,000 km², 15 species

Family Lorisiidae
Subfamily Lorisiinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus atys
Papio papio
Papio anubis
Cercopithecus diana
Cercopithecus petaurista
Cercopithecus campbelli
Cercopithecus aethiops
Erythrocebus patas

Subfamily Colobinae
Procolobus [badius] badius
Procolobus verus
Colobus polykomos
Family Pongidae
Pan troglodytes

Rwanda 26,000 km², 14-16 species

Family Lorisidae
Subfamily Lorisinae
Perodicticus potto
Subfamily Galaginae
(Galago demidovii ?)
(Galago inustus ?)
Galago senegalensis
Galago crassicaudatus
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus albigena
Papio anubis
Cercopithecus lhoesti
Cercopithecus mitis
Cercopithecus ascanius
Cercopithecus pogonias
Cercopithecus aethiops
Subfamily Colobinae
Colobus guereza
Colobus angolensis
Family Pongidae
Pan troglodytes
Gorilla gorilla

Guinea 246,000 km², 14 species

Family Lorisidae
Subfamily Lorisinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus atys
Papio papio
Papio anubis
Cercopithecus diana
Cercopithecus petaurista
Cercopithecus campbelli
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Procolobus [badius] badius
Colobus polykomos
Family Pongidae
Pan troglodytes

Liberia 111,000 km², 12 species

Family Lorisidae
Subfamily Lorisinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus atys
Cercopithecus diana
Cercopithecus nictitans
Cercopithecus petaurista
Cercopithecus campbelli
Cercopithecus aethiops
Subfamily Colobinae
Procolobus [badius] badius
Procolobus verus
Colobus polykomos
Family Pongidae
Pan troglodytes

Burundi 28,000 km², 11 species

Family Lorisidae
Subfamily Lorisinae
Perodicticus potto
Subfamily Galaginae
Galago senegalensis
Galago crassicaudatus
Family Cercopithecoidea
Subfamily Cercopithecoinae
Cercocebus albigena
Papio anubis
Cercopithecus lhoesti
Cercopithecus mitis
Cercopithecus aethiops
Subfamily Colobinae
Procolobus [badius] rufomitratu
Colobus angolensis
Family Pongidae
Pan troglodytes

Zambia 752,975 km², 10-12 species

Family Lorisidae
Subfamily Lorisinae
(Perodicticus potto ?)
Subfamily Galaginae
Galago senegalensis
Galago thomasi
(Galago zanzibaricus ?)
Galago crassicaudatus
Family Cercopithecoidea
Subfamily Cercopithecoinae
Papio cynocephalus
Papio ursinus
Cercopithecus albogularis
Cercopithecus mitis
Cercopithecus ascanius
Cercopithecus aethiops
Subfamily Colobinae
Colobus angolensis

Ethiopia 1,222,000 km², 10 species

Family Lorisidae
Subfamily Galaginae
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Papio anubis
Papio cynocephalus
Papio hamadryas
**Theropithecus gelada*
Cercopithecus neglectus
Cercopithecus mitis
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Colobus guereza

Togo 57,000 km², 10 species

Family Lorisidae
Subfamily Lorisinae
Perodicticus potto
Subfamily Galaginae
Galago demidovii
Galago senegalensis
Family Cercopithecoidea
Subfamily Cercopithecoinae
Papio anubis
Cercopithecus petaurista
Cercopithecus mona
Cercopithecus aethiops
Erythrocebus patas
Subfamily Colobinae
Procolobus verus
Colobus vellerosus

Guinea-Bissau 36,000 km², 9-11 species

- Family Lorisidae
 - Subfamily Lorisinae
 - (*Perodicticus polio* ?)
 - Subfamily Galaginae
 - (*Galago demidovii* ?)
 - Galago senegalensis*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Papio papio*
 - Cercopithecus petaurista*
 - Cercopithecus campbelli*
 - Cercopithecus aethiops*
 - Erythrocebus patas*
 - Subfamily Colobinae
 - Procolobus [badius] badius*
 - Colobus polykomos*
- Family Pongidae
 - Pan troglodytes*

Senegal 197,000 km², 9-11 species

- Family Lorisidae
 - Subfamily Galaginae
 - Galago demidovii*
 - Galago senegalensis*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Cercocebus atys*

- Papio papio*
 - (*Cercopithecus petaurista* ?)
 - Cercopithecus campbelli*
 - Cercopithecus aethiops*
 - Erythrocebus patas*
- Subfamily Colobinae
 - Procolobus [badius] badius*
 - (*Colobus polykomos* ?)
- Family Pongidae
 - Pan troglodytes*

Benin 113,000 km², 9-10 species

- Family Lorisidae
 - Subfamily Lorisinae
 - Perodicticus potto*
 - Subfamily Galaginae
 - Galago demidovii*
 - Galago senegalensis*
- Family Cercopithecidae
 - Subfamily Cercopithecinae
 - Papio anubis*
 - Cercopithecus petaurista*
 - (*Cercopithecus erythrogaster* ?)
 - Cercopithecus mona*
 - Cercopithecus aethiops*
 - Erythrocebus patas*
 - Subfamily Colobinae
 - Colobus vellerosus*



The Kibale Forest Reserve, Uganda, site of a major ecological study of rain forest primates since 1970. The conservation status of the forest needs upgrading to ensure its future protection (photo by John F. Oates).

Appendix 2

The Distribution and Status of the Most Threatened African Primate Species

Considered here are species with a threat rating of at least 4 in Table 2 (page 12), that is species regarded as highly vulnerable, endangered or highly endangered. The status information was provided by the IUCN Conservation Monitoring Centre, Cambridge, England, and the maps (pages 37-41) were drawn by Stephen Nash.

Barbary macaque *Macaca sylvanus*
Status: Once widespread throughout North Africa, it is now restricted to small patches of forest and scrub in northern Morocco and Algeria. A small feral population also occurs in Gibraltar. Population estimates vary between 9,000 and about 24,000, and 75% of the wild population occurs in the Middle Atlas, Morocco. It feeds eclectically and lives in multi-male groups which vary in size between areas. Numbers have declined dramatically in the past 50 years due mainly to habitat destruction. Throughout its range, remaining areas of habitat require strict protection. It breeds well in captivity and plans have been formulated to reintroduce surplus stock to areas where it occurred previously but is now extinct.

Drill *Mandrillus leucophaeus*
Status: Distribution of the drill is uncertain, but it appears to have a very restricted distribution in western Cameroon, being probably extinct in Nigeria and possibly so in Bioko. No population estimates exist, but numbers have undoubtedly declined dramatically in recent years and the only known protected population occurs within the Korup Reserve in Cameroon. The species is semi-terrestrial with a flexible social organization, small units occasionally joining to form groups of up to 200 animals. Seriously threatened by habitat destruction and hunting. Surveys are urgently required to determine whether viable populations occur outside Korup. If so, they require immediate protection, especially against hunting.

Gelada *Theropithecus gelada*
Status: Found only in the central highlands of Ethiopia. Estimates suggested a total population of c. 500,000 during the early 1970s; though it may well be lower now in the wake of the 1980s droughts. So long as the human population continues to increase, the species' habitat is under threat from encroachment by agriculture and deforestation. Efforts are needed to ensure the survival of the only conservation area in which the species occurs. The possibility of establishing a population in another suitable conservation area should be explored.

Diana monkey *Cercopithecus diana*
Status: Inhabits rain forest in Sierra Leone, Liberia, Ivory Coast, Ghana, and the southern edge of Guinea. Early reports of its occurrence in other areas are unconfirmed. No population estimates are available and reports of its rarity vary widely, although it is almost certainly threatened throughout much of its range as a result of habitat destruction and hunting. In all countries where it occurs it needs protection from hunting and the preservation of remaining areas of habitat. Further studies and local conservation education programmes are also urgently required.

Salongo monkey *Cercopithecus salongo*
Status: Endemic to Zaire where it is known from two specimens obtained from local hunters near Wamba, Zone de Djolu, 22°31'E, 0°01'N - 0°01'S. No other data are available.

Owl-faced guenon *Cercopithecus hamlyni*
Status: Occurs in the eastern Congo basin, in lowland, montane and bamboo forests. Deforestation is extensive in much of its range and no information is available on its occurrence within protected areas. Surveys of its status and distribution are urgently needed, as is full protection of remaining areas of habitat.

Preuss's guenon *Cercopithecus preussi*
Status: A montane forest species which has a very limited distribution on and around Mount Cameroon and on the island of Bioko. No population estimates exist, but it is believed threatened by habitat destruction and hunting and is particularly vulnerable because of its limited range. Surveys of its status and distribution are needed, as is full protection of remaining areas of habitat and enforcement of anti-poaching laws. A captive breeding programme needs instigating.

Harrison's monkey *Cercopithecus ? sp. (Gabon)*
Status: This monkey was discovered in the Forêt des Abeilles, Gabon, by M. J. S. Harrison in 1984. It is apparently a close relative of *Cercopithecus lhoesti* and *C. preussi*. Little information on its status is available, but it is obviously hunted since Harrison's discovery was based on hunters' kills (information from compiler).

White-throated guenon *Cercopithecus erythrogaster*
Status: Known only from south western Nigeria where it is restricted to small forest patches, although a possibility exists that it occurs in Benin. Threatened by habitat destruction and hunting. Numbers declining. Stringent habitat protection and hunting restrictions are needed, and further data on status and ecology required.

Red-eared guenon *Cercopithecus erythrotis*
Status: Two subspecies occur in Nigeria and Cameroon, and a third is endemic to Bioko. Lives in primary and secondary forests, and is threatened by habitat destruction and hunting. Stringent habitat protection and hunting restrictions are needed, and further data on status and ecology of all three subspecies are required. (Compiler's note: In this plan, the *sclateri* form of this guenon, found in eastern Nigeria, is regarded as a possibly distinct species. It is believed to be under great pressure from habitat destruction and hunting.)

Pennant's red colobus *Procolobus [badius] pennanti*
Status (pennanti form): Endemic to Bioko. No estimates of its population are available, and intensive hunting has put its survival in serious jeopardy. There is no recent information on its occurrence, and surveys are urgently needed required to determine whether any significant populations survive and can be saved.

(preussi form): Very restricted range in lowland evergreen forest of Cameroon. Total number unknown but believed to be less than 8,000. Its habitat of mature forest with emergent trees renders it particularly susceptible to logging activities. Still hunted for food, although it has been accorded partial protection. Only survives in the Korup Reserve and perhaps the Ejhagam Reserve.

(bouvieri form): Endemic to Congo (Brazzaville) where it has only been recorded in the Léfini Reserve. Numbers are perilously low, hunting is rife, and formal protection of the reserve has expired. Surveys of its distribution and status are needed extremely urgently and immediate protection from hunting and other forms of disturbance is required if it is to survive.

Zanzibar red colobus *Procolobus [badius] kirkii*
Status: Endemic to Zanzibar Island off the Tanzania coast, where it only occurs at relatively high densities in four forest areas in the south. The taxon lives in relatively large, multi-male groups in overlapping home ranges. It is severely threatened by habitat destruction within its very restricted range, and no populations are currently protected effectively. Jozani Forest Reserve and other remaining areas of habitat require full legal and practical protection if this species is to be saved.

Uhehe red colobus *Procolobus [badius] gordonorum*

Status: Endemic to Tanzania. Scattered and very restricted distribution in forests around the Uzungwa Mountains and Magombero Forest Reserve. It is extremely rare. The population most likely to be viable occurs in the Magombero Forest which has been bisected by the Zambia-Tanzania railway and is severely threatened by further habitat disturbance. In the Uzungwa highlands, some populations have been virtually eliminated by hunting. Thorough conservation measures have been proposed and need to be implemented immediately if this species is to be saved.

Black colobus *Colobus satanas*

Status: Restricted to high forest in the evergreen rain forest belt from Cameroon to the Congo River; also occurs in Bioko. Numbers declining because of hunting and habitat destruction. Apparent inability to survive in secondary forest following logging increases its vulnerability, and it is now only found in protected or inaccessible areas. Currently protected in at least one reserve in Cameroon, but hunting and oil exploration threaten it there. Further information on its status and distribution are urgently needed.

Bonobo *Pan paniscus*

Status: The bonobo has a discontinuous range in the central Zaire basin of Equatorial Africa, south of the Zaire and Lomami Rivers. Although the extent of potential habitat is in the region of 350,000 km², the bonobo is believed to occur in only small isolated groups within this range. There are no substantive data concerning total numbers and all estimates are speculative, ranging from 100,000 - 200,000 down to about 15,000; as of 1982 only a few viable populations were known. The species is

hunted for dietary and religious purposes, but the most serious threat comes from an increase in traditional slash-and-burn agriculture, and from commercial logging operations. Although protected by law, enforcement is negligible. Also no existing national park is known to harbour the species. The most urgent conservation requirement therefore is to establish parks and reserves in areas where the bonobo's presence has been verified. A survey is also required to determine more fully the species distribution and abundance. The bonobo does breed in captivity.

Gorilla *Gorilla gorilla*

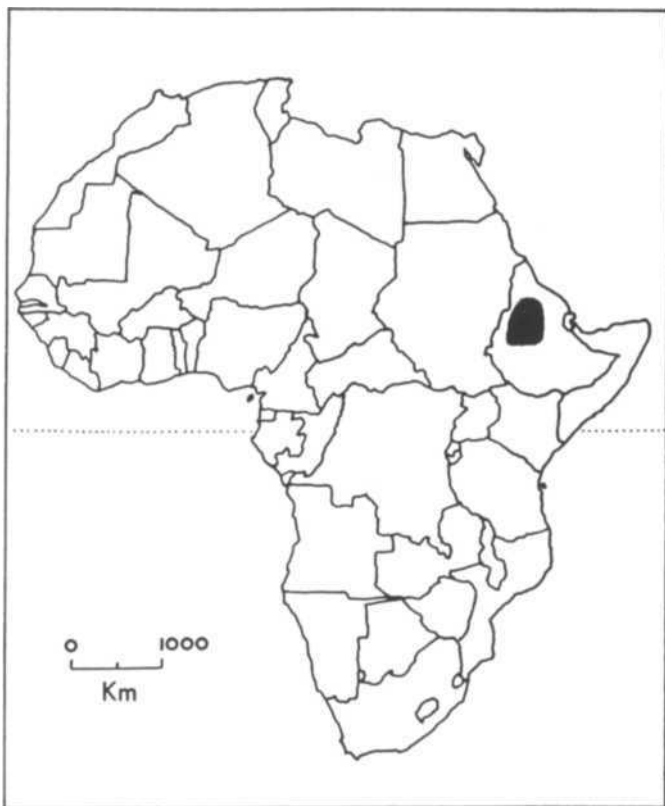
Status: Gorillas occur in two regions of Africa - equatorial west Africa and east central Africa, the two areas being separated by the 1,000 km of the Congo Basin tropical forest. Three subspecies are now usually recognized. The western lowland gorilla (*G. g. gorilla*) from Cameroon, Central African Republic, Congo (Brazzaville), Equatorial Guinea, Gabon, Cabinda enclave and possibly southeast Nigeria; the eastern lowland gorilla (*G. g. graueri*) from eastern Zaire; and the mountain gorilla (*G. g. beringei*) from the Virunga Volcano region of Rwanda, Uganda and Zaire, and the Bwindi Forest Reserve of Uganda. Little detailed knowledge exists of gorilla numbers, and details of their distribution in Zaire and Congo (Brazzaville) are largely unknown. In Gabon, a nationwide census undertaken between December 1980 and February 1983 estimated numbers to be 35,000 ± 7,000. The eastern lowland gorilla possibly numbers about 3,000 - 5,000, and the endangered mountain gorilla about 400. Forest clearance for agriculture and commercial logging, and hunting for food, are factors which which adversely affect gorillas and are likely to increase as human numbers rise.



Macaca sylvanus



Mandrillus leucophaeus



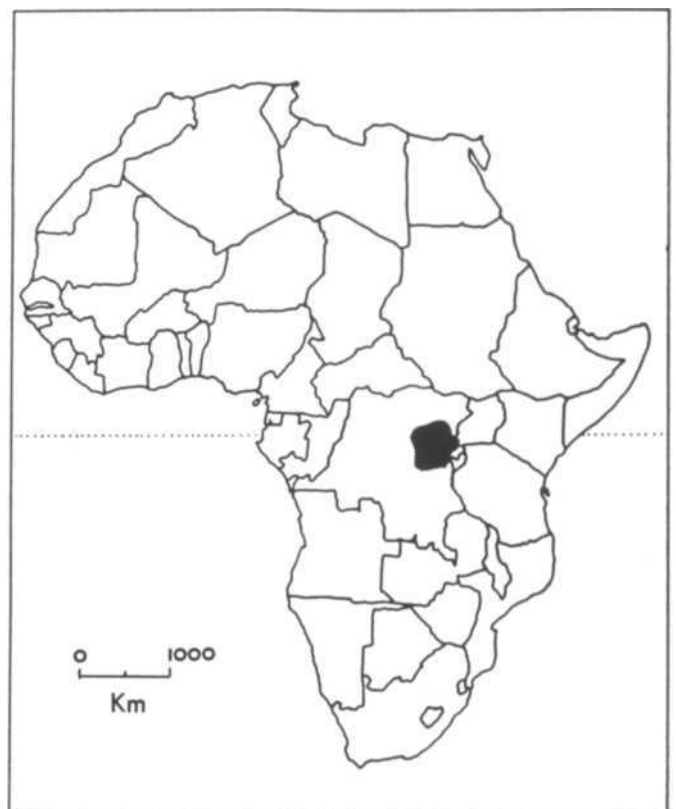
Theropithecus gelada



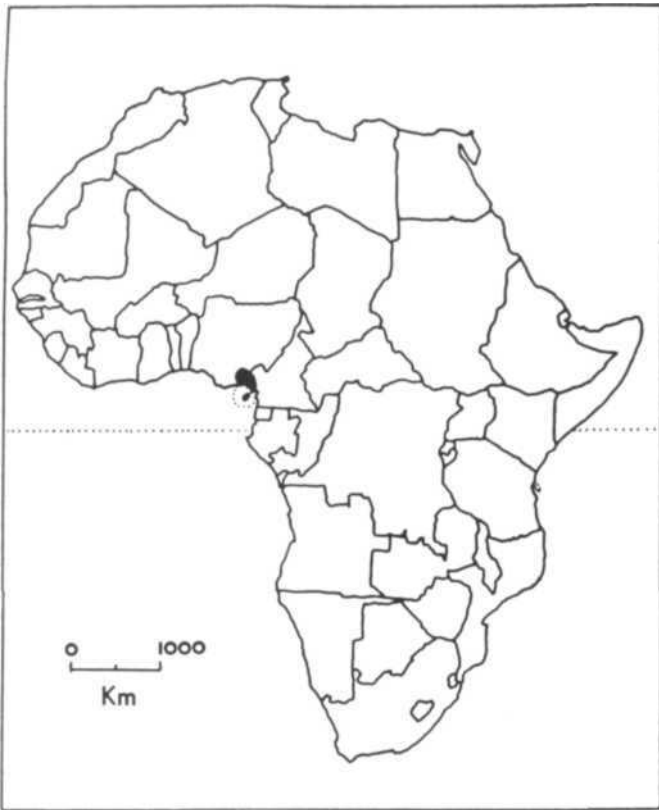
Cercopithecus diana



Cercopithecus ?salongo



Cercopithecus hamlyni



Cercopithecus preussi



Cercopithecus sp. (Gabon)



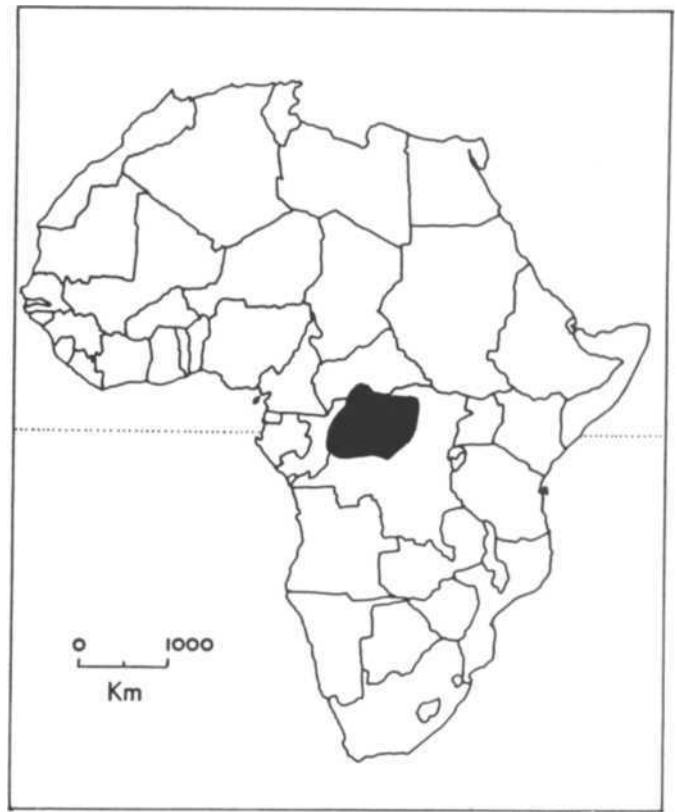
Cercopithecus erythrogaster



Cercopithecus ?sclateri



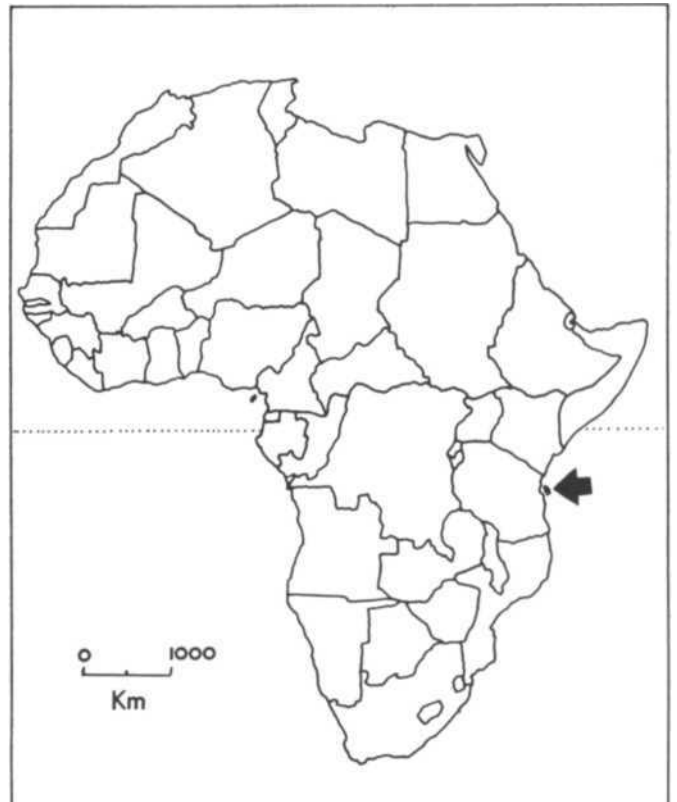
Cercopithecus erythrotis



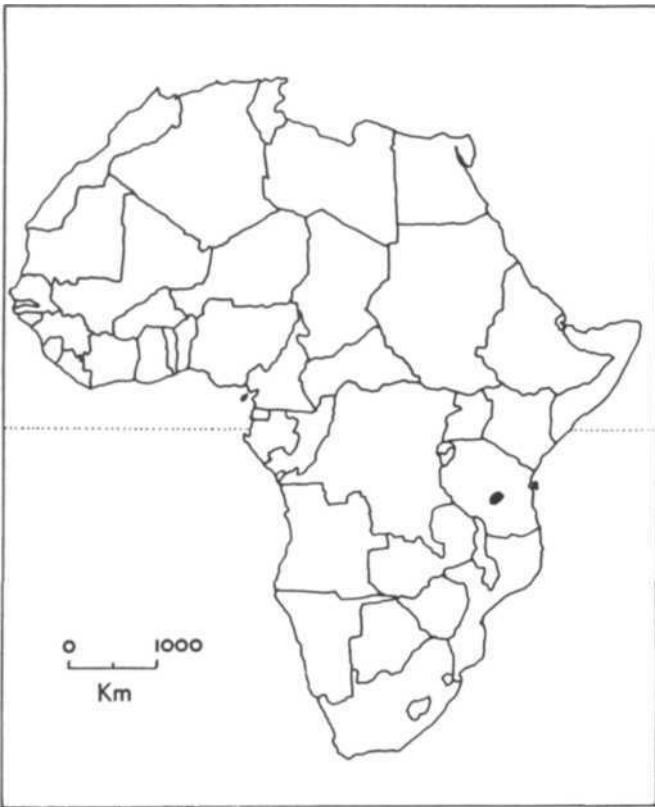
Allenopithecus nigroviridis



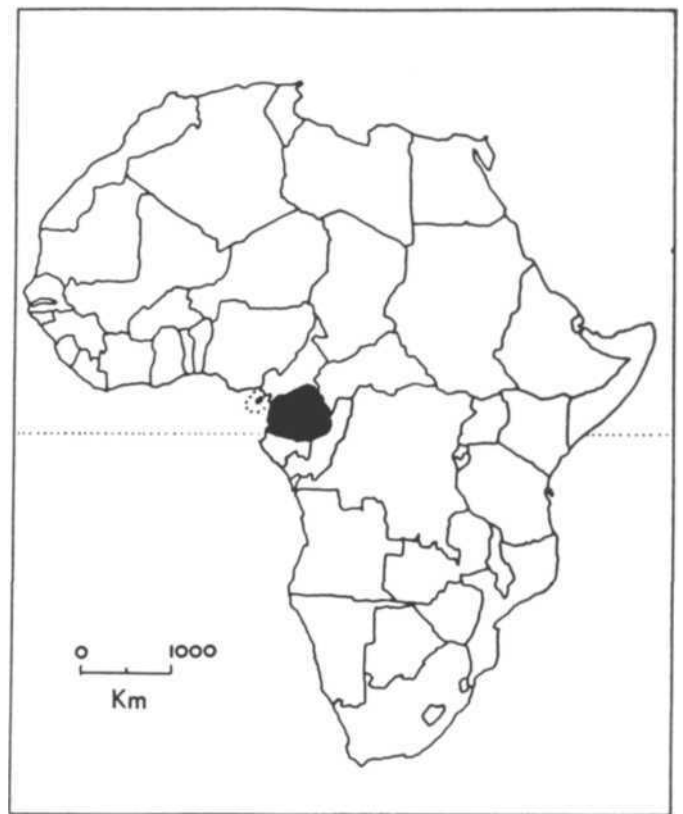
Procolobus (badius) pennanti



Procolobus (badius) kirkii



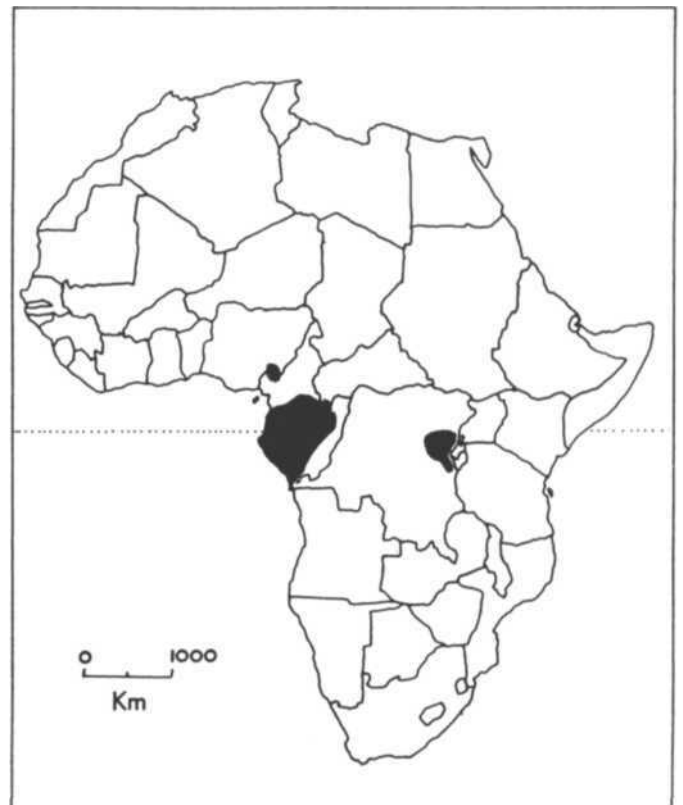
Procolobus (badius) gordonorum



Colobus satanas



Pan paniscus



Gorilla gorilla