ANTELOPES
GLOBAL SURVEY
and
REGIONAL ACTION PLANS
PART 1.
EAST AND NORTHEAST AFRICA

Compiled by
R. East
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IUCN/SSC Antelope Specialist Group
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Foreword

The Antelope Specialist Group was created in 1978, through the initiative of the late Harold J. Coolidge, founder of the Species Survival Commission and a former President of IUCN. The first ASG meeting was held in May 1980, in Kenya’s Tsavo National Park, on the occasion of the 53rd Meeting of the SSC. The participants in the two ASG sessions agreed that a world survey of the antelopes, with the objective of assessing their conservation status and trend everywhere they occur, should be the first priority of our group.

The family Bovidae includes 11 tribes, 32 genera, and some 86 species of so-called antelopes, a taxonomically meaningless term that merely distinguishes those hornless-horned ruminants which are neither cattle, sheep, nor goats (or the allied goat-antelope and muskox tribes). As antelopes inhabit every African country and most of Asia (apart from Southeast Asia), the success of the Survey depended on locating and gaining the cooperation of many different informants. The process was begun before the first meeting by sending out Antelope Inventory Report Forms (later revised and simplified), often with the status check sheets used in preparation of the Mammal Red Data Book, and still continues, as new sources of information are located.

But without Rod East, there is no telling when or even if the survey would have been completed and published. Rod volunteered his services soon after being appointed to the ASG in November 1982, and followed up with a letter (20 May 1983), in which he said, “...I am extremely keen to assist and I am prepared to put in a major effort. Specifically, I would be very happy to collate, analyse and edit antelope survey material, to write to particular individuals within the ASG and help to track down others who can provide useful information to the antelope survey.”

Thad East was highly qualified to serve as compiler and editor as was obvious from his publications, particularly “Area requirements and conservation status of large African mammals” (Nyala 7: 3-20, 1981) and “Species-area curves and populations of large mammals in African savanna reserves” (Biological Conservation 21:111-26, 1981). Unfortunately, for reasons beyond his control, Rod was unable to get started on this task until June of 1985.

Since then, he has accomplished the major part of what he promised:

1. He has written literally hundreds of letters, which have led slowly but surely to a truly remarkable accumulation of information about the status of antelopes and of wildlife conservation in virtually every African country. (The survey of Asian antelopes will be processed after the results of the African survey have been published.)

2. In the course of compiling the information about the antelopes of each country that he gleaned through correspondence and from published reports, Rod prepared the first drafts of each chapter, which he then circulated for comments and corrections. The individual(s) who supplied most of the information about a given country, was offered authorship or co-authorship in return for assuming responsibility for the chapter’s accuracy.

3. He has prepared all the maps.

4. After finalizing the chapters in Part One, East proceeded to draft a “Summary of status of antelopes in East and Northeast Africa and regional action plan for antelope conservation,” which he then circulated among ASG and other wildlife experts for comment and criticism. The end product fairly reflects the views and recommendations of the Antelope Specialist Group.

The dedication and productivity of Rod East have impressed nearly everyone who has had any connection with the Antelope Survey. His output would be impressive even for someone who was working on it full-time. But East works for the New Zealand Ministry of Agriculture and Fisheries as leader of a research group at the Ruakura Research Centre. He has managed to turn out all those letters, complete the first, most of the second, and a good deal of the third part of the Antelope Survey, in under two years in his spare time, during evenings and weekends!

Extraordinary as his accomplishments may seem to others, East himself tends to downplay his contribution, saying simply (in litt. 5 Nov 86), “I wouldn’t be doing it if I didn’t both enjoy it and think it worthwhile.” Seemingly he has reached the point where he churns out copy almost by reflex for, after asking me to write a General Introduction to the Antelope Survey in Chapter One, he went ahead and drafted it himself. After reading and rereading it, I can’t think of any way to improve either on its content or style. So my own small contribution to Part One of the Antelope Survey will consist solely of this foreword.

My first concern has been to see that Rod East receives all the credit he deserves. Next I want to express my appreciation to all those who have contributed valuable information to the Antelope Survey, including many who are not members of the Antelope Specialist Group; some have been singled out for special thanks in the Compiler’s Note and Acknowledgements. Finally, I want to express our appreciation to IUCN for committing the funds to publish Parts One and Two (and hopefully for the rest of the Antelope Survey), and particularly to Simon Stuart, SSC Species Programme Officer, for staunchly advocating publication.

Considering the breadth and depth of information contained in the four or five volumes of the Antelope Survey, it is not too much to hope that this publication will contribute to the conservation not only of antelopes but of all other wildlife and wildlife habitats in the regions surveyed.

Richard D. Estes, Chairman
Antelope Specialist Group

Compiler’s Note and Acknowledgements

The Antelope Survey has been conducted by sending out status checksheets and Antelope Inventory Report Forms to Antelope Specialist Group members and correspondents. Completed checksheets, forms and notes on antelopes provided by contributors for particular countries formed the basis of initial drafts of the Antelope Survey country reports. The initial drafts for countries in East and Northeast Africa were prepared between November 1985 and May 1986. These drafts were then modified as necessary by the authors (who contributed the original information). The final country reports were used to prepare a status summary/regional Action Plan for antelope conservation. This was completed in July 1986 and circulated to ASG members. Comments on that draft and new information received up to December 1986 have been incorporated into the regional Action Plan included in this volume.

The accuracy of each country report is the responsibility of the
author(s). The regional Action Plan is the result of the combined efforts of ASG members with expertise on the region and antelope conservation in general. Preparation of this Action Plan has, in some cases, involved compromises between the conflicting opinions of different experts. While I have attempted to be objective and unbiased in these cases, I accept responsibility for any errors or omissions in the final Action Plan. Information will be gratefully received from any reader who detects errors in this volume, or has more recent or detailed information on the status of any antelopes in the countries included in this account. If possible, completion of an Antelope Inventory Report Form (appendix 1) will be especially useful.

I am very grateful for the willing assistance I have received from ASG members and many others in compiling this report. I am especially grateful to the following: Dick Estes, Chairman of the ASG, for his guidance and support; Simon Stuart, for his invaluable help in preparation of the Antelope Survey for publication; all of the authors of the country reports, for their cooperation and prompt revision and return of manuscripts; T. Butynski, K.F.W. Barnes, I. Douglas-Hamilton, H. Welch and D.W. Yalden also provided valuable information on antelopes in individual countries; Vivian Wilson, for reviewing the section on duikers in each country report; I.L. Anderson, K.H.V. Bell, D.H.M. Cumming, R.D. Estes, G.W. Fraune, J.M. Fryxell, P. Grubb, J.C. Hillman, B.J. Huntley, M.E. Keep, J.E. Newby, W.A. Rodgers, J.A. Sayer, R. Schuster, A. Simonetta, C.A. Spinage and V.J. Wilson for helpful information and constructive criticism of the draft status summary/Action Plan. Finally, special thanks are due to the Worldwide Fund for Nature for paying for the printing of this publication, and for supporting the SSC Action Planning process.

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SECTION 1: INTRODUCTION

Chapter 1: Objectives, Scope and Limitations of the Antelope Survey

R. East

General Introduction to Part I of the Antelope Survey

The Antelope Specialist Group's Antelope Survey has been conducted to assess the current distribution, abundance and conservation status of antelopes in all countries where they occur. Part I presents the results obtained for nine countries in East and Northeast Africa (Fig. 1). Other regions of Africa and Asia will be covered in subsequent volumes.

Africa is of central importance to the Antelope Survey. The continent's tropical savannas, especially those of East and Northeast Africa, support the world's most spectacular mammalian fauna. Antelopes comprise a significant part of the herbivore biomass of these savanna communities, and include a much greater diversity of species than other groups of medium-sized to large mammals, with a continental total of 55-60 savanna antelope species (depending on taxonomic treatment). Africa's lowland and montane forests also support diverse antelope communities including approximately 20 species, of which about 75% are duikers.

Conservation of Africa's rich antelope communities is of major international significance. Antelopes are a valuable natural resource, forming important sources of protein for human consumption and other products such as skins in many African countries. The diversity of antelopes may include species with major potential to contribute to man's future through domestication. In addition, Africa's spectacular wildlife is a priceless global heritage, which is deeply instilled in human culture; there is strong evidence that the African plains were the cradle of human evolution. The magnificent spectacles provided by large herds of antelopes and other game with their attendant predators form a vital part of the continent's unique wildlife.

The wildlife of Africa in general, and East and Northeast Africa in particular, faces an uncertain future. Large areas of the continent are affected by rapid growth of human populations, agricultural expansion, forest destruction, degradation of savanna habitats through overgrazing by domestic livestock, uncontrolled hunting, and economic poverty. Continuing expansion of human activities will inevitably lead to further destruction of antelope populations and their habitats. The long-term survival of viable populations of antelopes (and other wildlife) depends upon:

1. Adequate protection and management of natural habitat in conservation areas, including large national parks and reserves in areas of exceptional abundance and high species diversity, and smaller reserves where necessary for antelopes with localised distributions;
2. Development of forms of land use which enable human and wildlife populations to co-exist to the greatest degree possible, e.g., in buffer zones surrounding strictly protected conservation areas, and over more extensive areas where the predominant form of land use (e.g., pastoralism) is not inimical to the existence of large wild animals;
3. Greater public awareness of the need for and value of wildlife conservation, including establishment at the local level of wildlife utilisation schemes which allow rural populations to benefit materially from conservation.

Almost all African countries have gazetted substantial areas as national parks and reserves and many countries devote a significant proportion of their annual budgets to wildlife conservation (Bell & Clarke 1986), but there is a desperate need to upgrade the protection and management of many existing conservation areas. In some cases, new conservation areas are required for natural communities which are poorly represented in the existing system. In their extensive and detailed review of conservation requirements in the Afrotropical realm, MacKinnon & MacKinnon (1986) conclude that it will cost in the order of US $1 billion (current values) over the next decade to develop and manage an adequate network of conservation areas to conserve the realm's natural heritage. While national budgets will continue to be the primary source of funds for nature conservation, international financial assistance will also be essential. MacKinnon & MacKinnon point out that the next decade may provide the last chance to develop a successful formula for man and wildlife to co-exist in Africa.

Objective

A suggested goal for international antelope conservation policy is "to ensure the long-term survival of all antelope species by maintaining as many viable populations as possible of each species in as wide a range of its habitats as is practical" (modified after Parker's (1984) definition of the goal of elephant conservation in Africa). Key words in this goal are "possible" and "practical"; to succeed, antelope conservation must not be an end in itself, but part of an overall environmental conservation strategy which takes full account of, and is integrated with, human development needs.

The most immediate constraint to the attainment of this objective is the severely limited financial resource available for wildlife conservation in Africa (Cumming et al. 1984; Parker 1984; Bell & Clarke 1986). Shortage of land for conservation is also a serious constraint in many countries. These constraints are unlikely to lessen, given Africa's rapid human population growth, poverty, and in some areas political turbulence. It is therefore necessary to draw up an order of priority for international assistance to conservation action in Africa.

As a scientific advisory group, the most appropriate action of the Antelope Specialist Group to assist the attainment of this goal was considered to be the establishment of the Antelope Survey. The objectives of this survey are to determine the current distribution, abundance, and conservation status of antelopes, identify species and areas for which knowledge is seriously inadequate, and identify antelopes whose survival is threatened. As an integral part of the survey, the information gathered is used to establish priorities for international conservation action. This includes preparation of regional Action Plans for antelope conservation.
Scope of the Antelope Survey

This survey is concerned solely with antelopes. Integration of the results of the Antelope Survey and Action Plans with those prepared for other taxa by different SSC Specialist Groups (e.g., Cumming & Jackson 1984; Oates 1986) will be necessary for the establishment of overall conservation priorities.

The classification of the region’s antelopes adopted for the Antelope Survey is given in chapter 2. Section 2 (chapters 3–11) contains a report on each of the nine countries included in the East and Northeast African region (Fig. 1). Section 3 includes a summary of the status of antelopes within the region, identifies conservation priorities, and outlines a regional Action Plan for antelope conservation.

The reports on individual countries (section 2) have been prepared according to a standard format:

(1) A brief introduction to the country.
(2) An overview of the country’s antelope fauna and its current conservation status, including a tabulation of the authors’ assessments of species known to occur (at present or formerly) within the country. These status assessments are based on Red Data Book categories, with the definitions modified slightly to meet the requirements of the Antelope Survey (note that the definitions apply to the status within each country, not to the overall (global) status of each species):
- extinct: no longer occurs in the wild;
- endangered: in danger of extinction and unlikely to survive if the causal factors continue operating;
- vulnerable: declining and likely to move into the endangered category in the near future if the causal factors continue operating;
- rare: population small, not endangered or vulnerable at present, but at risk;
- indeterminate: known to be endangered, vulnerable, or rare, but not enough information available to determine which of these categories is appropriate;
- satisfactory: survival not threatened; this category often includes species whose total population in the country may be declining, but which are well represented by viable, stable or increasing populations within conservation areas;
- insufficiently known: lack of information precludes an assessment of status.

The summary of the regional status of antelopes in section 3 is based on quantitative, rather than qualitative, criteria. The quantitatively defined regional status categories, viz., endangered, rare, threatened, and not threatened/satisfactory are defined in chapter 12 and are italicised to distinguish them from the Red Data Book categories above.

(3) A brief overview of conservation measures taken to protect antelope populations, with emphasis on the establishment of conservation areas.
(4) An outline of conservation measures proposed.
(5) Accounts of individual species, including distribution (with a map for each species, except for countries where antelopes are now largely restricted to conservation areas—this applies to Rwanda and Burundi among the countries covered in this volume), population (estimates of the total population in the country and whether numbers are increasing, stable, or decreasing are included where available), status (based on the above Red Data Book categories), and conservation measures taken (emphasising occurrence within conservation areas and, where available, estimates of populations and population trends within conservation areas). For countries where detailed species inventory reports (appendix 1) are available and there is little or no published data on antelope ecology and behaviour, a brief summary of information on each species’ habitat, food and reproduction is also included—this applies to Sudan and Ethiopia in this volume.

Limitations of the Antelope Survey

The value of the Antelope Survey is restricted by the accuracy and extent of the available information. While every attempt has been made to obtain as much up-to-date information as possible, many gaps remain in our knowledge of antelope distribution, abundance and conservation status, as acknowledged in the country reports and in section 3. The rapidity of events in Africa which influence antelope populations will inevitably make some parts of the survey results out of date in the near future. Nevertheless, sufficient information on the current status of antelopes in each country has been gathered by experienced and knowledgeable observers (chapters 3–11) to allow at least a broad overview of the regional status of each species (chapter 12).

As much quantitative data as possible on antelope populations are included in the species accounts in chapters 3–11, to provide a baseline for future comparisons. Where the sources of population estimates are unreferenced, they have arisen from the authors’ research or observations. This information on antelope populations is used to assess regional status in chapter 12, but we strongly emphasize that all population estimates must be interpreted with great caution. Many antelopes, e.g., woodland species, are difficult to count accurately from both the air and the ground because some individuals are usually obscured by vegetation. Many of the smaller species are cryptically coloured and secretive, increasing the difficulty of achieving accurate counts within sample areas. In addition to these sources of bias, most antelope population estimates have large statistical sampling errors and wide confidence intervals, such as estimates derived from low-intensity aerial surveys. Because of these limitations, population estimates generally allow the reliable detection of only large-scale changes in numbers between sampling occasions.
The identification of key species, antelope communities, and areas for conservation action (chapters 12 and 13), and the regional Action Plan (chapter 14) identify the most important action required to maintain the diversity of antelopes on a region-wide basis. It is beyond the scope of the Antelope Survey (and would exceed the role of IUCN/SSC Specialist Groups) to prepare detailed, area-specific plans for conservation action. Such plans may range from brief outlines of the factors influencing conservation areas and key antelope populations/communities, with suggested interim solutions, to detailed management plans based on in-depth analyses of the socio-economic and biological factors involved. Preparation of detailed, specific conservation plans is properly the role of national conservation agencies, with or without assistance from international agencies. The Antelope Survey and regional Action Plans identify key areas where international assistance to antelope conservation should receive high priority.

References


Chapter 2: Classification of Antelopes Adopted for the Antelope Survey

R. East, P. Grubb and V.J. Wilson

Antelope Species

The species is the taxonomic unit of the Antelope Survey. Fifty-nine species are recognized as occurring in the nine countries included in the East and Northeast African region:

Family Bovidae

Subfamily Bovinae

Tribe Tragelaphini

Tragelaphus scriptus (Pallas 1766)
Tragelaphus spekii P.L. Schlegel 1864
Tragelaphus imberbis Blyth 1869
Tragelaphus strepsiceros (Pallas 1766)
Tragelaphus bagoni (Lydekker 1910)
Tragelaphus oryx (Pallas 1766)
Tragelaphus derbianus (Gray 1841)
Tragelaphus suricatus (Ogilby 1837)

Subfamily Cephalophinae

Cephalophus monticola (Thunberg 1789)
Cephalophus adersi Thomas 1918
Cephalophus harveyi (Thomas 1893)
Cephalophus natalensis A. Smith 1834
Cephalophus nigrifrons Gray 1871
Cephalophus weynsi Thomas 1901
Cephalophus dorsalis Gray 1846
Cephalophus leucogaster Gray 1873
Cephalophus rufilatus Gray 1846
Cephalophus silvicultor (Afzelius 1815)
Cephalophus spadix True 1890
Sylvicapra grimmia (Linnaeus 1758)

Subfamily Reduncae

Redunca arundinum (Boddart 1785)
Redunca rudinca (Pallas 1767)
Redunca fulvira (Afzelius 1815)
Kobus ellipotispyrrhus (Ogilby 1833)
Kobus kob (Erxleben 1777)
Kobus vardonii (Livingstone 1857)

Subfamily Hippopotamidae

Kobus megaceros (Fitzinger 1855)
Hippotragus equinus (Desmarest 1804)
Hippotragus niger (Harris 1838)
Oryx dama (Cretzschmar 1826)
Oryx gazella (Linnaeus 1758)
Addax nasomaculatus (Blainville 1816)

Subfamily Alcelaphinae

Alcelaphus buselaphus (Pallas 1766)
Alcelaphus lichtensteinii (Peters 1852)
Dama napucus (P.L. Schlegel 1819)
Dama dama (Burchell 1824)
Connochaetes taurinus (Burchell 1823)

Subfamily Aepycerotinae

Aepyceros melampus (Lichtenstein 1812)

Subfamily Antilopinae

Tribe Aammodorcas

Ammodarca clarkei (Thomas 1891)

Tribe Antilopini

Litocranius walleri (Brooke 1879)
Gazella dorcas (Linnaeus 1758)
Gazella leptoceros (F. Cuvier 1842)
Gazella rufifrons Gray 1846
Gazella thomsonii Günther 1884
Gazella spekei Blyth 1863
Gazella soemmerringii (Cretzschmar 1828)
Gazella granti Brooke 1872
Gazella dama (Pallas 1766)

Tribe Neotragini

Neotragus batesi De Winton 1903
Neotragus moschatus (Von Duenen 1846)
Raphicerus sharpei Thomas 1897
Raphicerus campestris (Thunberg 1811)
Subspecies are included in a few cases, however, where they are highly distinctive morphologically, behaviourally and/or geographically, and are usually recognised as distinctive by wildlife managers in the field. These criteria apply to the following subspecies:

- Ruwenziro Black-fronted Duiker
- Ringed/Common Waterbuck
- Defassa Waterbuck
- White-eared Kob
- Uganda Kob
- Beisa Oryx
- Fringe-eared Oryx
- Coke’s Hartebeest
- Lelewel Hartebeest
- Hybrid Kenya Hartebeest
- Swaine’s Hartebeest
- Tora Hartebeest
- Topi
- Tiang
- Coastal Topi
- Eastern White-bearded Wildebeest
- Western White-bearded Wildebeest
- Nyassa Wildebeest
- Pelzeln’s Gazelle
- Heuglin’s Gazelle
- Mongalla Gazelle
- Thomson’s Gazelle
- Dahlae Gazelle
- Haggard’s Oribi
- Kenia Oribi

The decision on which subspecies to include and which to exclude is arbitrary, e.g., other distinctive subspecies such as Roosevelt’s sable (Hippotragus niger roosevelti) and Peters’ gazelle (Gazella granti petersi) could also justify inclusion; where appropriate, these subspecies, in addition to those listed above, are mentioned in the country reports and/or section 3.

References


SECTION 2: COUNTRY REPORTS

Chapter 3: Sudan
J.C. Hillman and J.M. Fryxell

Introduction

Sudan is the largest country in Africa, with more than 2.25 million sq km, extending from waterless deserts in the north to moist savannas, floodplains and rainforest in the south. Human population density is relatively low, although in many areas man’s activities have had a considerable impact on large wild animals. Wildlife populations in the more arid northern and central parts of the country have been reduced markedly, but the Southern Region contains a greater abundance of antelopes than any other country in Africa, with the exceptions of Tanzania and possibly Botswana. The southern Sudan was virtually isolated from the rest of the world during the protracted civil war that lasted from 1957 to 1972. It remains a remote area, with few roads traversing the vast expanses of floodplain and savanna grasslands. Much of this area is virtually impassable during the 7 to 8 month wet season.

Sudan was among the first African countries to establish wildlife conservation areas, with several reserves gazetted originally in the 1930s. During the last decade an active Wildlife Department has been established in the Southern Region, and major wildlife research and education programmes have been initiated with the support of international conservation organisations (e.g., Bottani 1981; Hillman 1982, 1983; Mefit-Babiec 1983; Fryxell 1985).

Current Status of Antelopes

Sudan has an exceptionally diverse antelope fauna (Table 1) (34 species with kob and hartebeest each represented by two highly distinctive subspecies), reflecting the great diversity of habitats (Fig. 1). This habitat diversity is illustrated by the presence of seven out of the nine tragelaphine antelope species, the highest number in any African country. The antelopes of the desert and arid zones, such as addax, scimitar-horned oryx, and dama, dorcas and slender-horned gazelles, have suffered severely from overhunting and habitat destruction but little is known about their current status. In Sudan’s arid zone and northern savannas, habitat destruction resulting from overgrazing by domestic livestock and excessive tree felling, aggravated by severe droughts, has had similar catastrophic effects as elsewhere in this ecological zone in Africa, with reduced carrying capacity and increasing desertification (Cloudsley-Thompson 1971). The reduction in numbers and contraction in range of most species of large mammals in the northern savannas has been documented by Wilson (1979) for Southern Darfur Province.

Most of the surviving wildlife is in the Southern Region, i.e., the provinces of Eastern and Western Equatoria, Bahr el Ghazal, El Ruheyret, Jonglei and Upper Nile (Fig. 2), where it is protected by the Region’s inaccessibility. Ruweg, bushbuck, waterbuck, bohar reedbuck, lewel hartebeest, grey duiker and oribi occur widely or throughout the southern savannas and grasslands. Giant eland, red-flanked duiker and Uganda kob are confined to suitable habitats within the wooded savanna zone in the southwest (Fig. 1). The extensive seasonally inundated floodplains, over 100,000 sq km in area, support large migratory antelope populations which rival those of the Serengeti-Mara ecosystem in Tanzania and Kenya. These migratory populations include hundreds of thousands of white-eared kob, tiang and Mongalla gazelle and smaller numbers of other species such as common eland and bohar reedbuck. The Sudd swamps, one of Africa’s most extensive swamp systems, are inhabited by substantial populations of sitatunga and Nile lechwe. An area of dry bush country in south-eastern Sudan provides similar habitats to northern Kenya, northeastern Uganda, and the southern Ethiopian lowlands. Antelopes whose range in the Sudan is largely or entirely restricted to this area include lesser kudu, beisa oryx, Grant’s gazelle, klipspringer and Guenther’s dikdik.

The rainforest zone on the Zaire border in southwestern Sudan (Fig. 1) is approximately 4600 sq km in area. It contains a high population density of bongo, plus blue and yellow-backed duikers, sitatunga, other large forest mammals such as giant forest hog (Hylas assemeri), and several species of primates including chimpanzee (Pan troglodytes). The relatively small area of montane forest (960 sq km) in the Imatong Mountains on the Uganda border is inhabited by blue and Weyns’ duikers, and a giant race of bushbuck.

The current status of antelopes in the Sudan is generally satisfactory, apart from those species which do not occur in the Southern Region (Table 1). Several species whose status is rated as satisfactory at present occur in substantial populations in the Southern Region, but within relatively small ranges, e.g., common eland, sitatunga, blue duiker, white-eared kob, Nile lechwe, beisa oryx, Guenther’s dikdik, and Grant’s gazelle. The status of these species could deteriorate rapidly if unfavourable factors came into effect within their very limited ranges.

The future of the southern Sudan’s spectacular antelope fauna and other wildlife depends on conservation programmes proceeding sufficiently rapidly to counteract the threats posed by such factors as increasing human populations, development and overhunting. Major development projects such as the Jonglei Canal, which bypasses the impenetrable Sudd swamps with a route east of the Nile (Fig. 2; No. 21), could have a major impact on antelope populations. In this case, at least, a major research programme has investigated the ecological consequences of development and recommendations have been published for the area’s future conservation management (Mefit-Babiec 1983). Exploitation of the oil reserves which have been discovered in parts of the Nile floodplain could have detrimental effects on wildlife. The increasing numbers of livestock in the southern Sudan are likely to result in increasingly severe conflicts with antelopes for dry-season pasturage and water supplies.

Overhunting, especially by heavily armed gangs of commercial hunters, also poses a serious threat to wildlife. Commercial-scale poaching in the southern Sudan has so far been directed mainly at elephant (Loxodonta africana) and rhinoceroses (Ceratotherium simum and Diceros bicornis). The increasing use of firearms, many of which came from Uganda at the overthrow of Amin, could decimate the Southern Region’s antelope populations if adequate controls are not established and maintained.

Rinderpest also poses a potential threat, particularly to highly susceptible species such as tragelaphine antelopes. This discas
was reported to have killed giant eland, tiang and buffalo in Bahr el Ghazal Province recently (M.H. Woodford, in litt. 1984). In addition, there have been isolated occurrences of anthrax in tiang in Jonglei Province (S. Ramachandran, pers. comm.).

Conservation Measures Taken

The legal basis for wildlife conservation in the Southern Region is the enlightened and wide-ranging Wildlife Conservation and National Parks Act 1975–76. Included in this Act are schedules of wildlife species which are protected totally from hunting (Schedule I), specially protected species which may only be hunted or captured with a special licence (Schedule II), and protected species which may only be hunted outside protected areas using traditional methods (Schedule III). The Act also includes a schedule of national parks and reserves.

The existing and proposed conservation areas (Fig. 2) represent an impressive start to overcoming the massive logistical and socio-economic problems that confront wildlife conservation in the southern Sudan, but much remains to be done. Some of these areas have been developed and managed to some extent, with game scout outposts, boundary demarcation and some tracks established. Others exist only on paper or have not yet been gazetted. The Boma National Park, for example, has been proposed to protect the dry season concentration area of the migratory populations of white-eared kob, tiang, Mongalla gazelle and other species at the foot of the Boma Plateau. An expatriate warden and support staff were appointed to this national park in 1981 with financial support from the Frankfurt Zoological Society. They were forced to leave in 1983, when renewed fighting broke out, and have been unable to return.

Dinder National Park was established in 1935 and is Sudan’s major existing wildlife conservation area outside the Southern Region. It is severely threatened by agricultural development of the surrounding areas, poaching and invasion by large herds of domestic livestock (Abu Shama 1981; Allam 1981; Whitney & el Moghroby 1982). Other conservation areas have been gazetted or proposed in the north (e.g., Erkowit and Sabaloka Gorge Reserves, Radom National Park), but their status at present is uncertain.

Conservation Measures Proposed

Sudan’s antelope populations comprise on outstanding natural resource of major value for the production of meat and hides and, in the longer term, tourism. The future of this natural resource depends on the allocation of sufficient facilities and personnel to develop active, effective conservation programmes and consolidate the existing conservation areas. This will not be pos-

![Fig. 1. Approximate major ecological zones of Sudan.](image)

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<td>Mountain Reebuck</td>
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*En = endangered; R = rare; I = indeterminate (i.e., endangered, vulnerable, or rare); K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.

Sustainable in a developing country such as the Sudan without continued financial support from international conservation organisations.

As Cobb (1981) pointed out, a major challenge facing wildlife conservation in the Sudan is the development of national parks and reserves which have the support of the local people. To the Murle of Boma and the Dinka of Jonglei, for example, kob and tiaag respectively represent major sources of protein. The development of conservation areas in the Sudan is unlikely to succeed if it fails to take into account the legitimate grazing and hunting rights of local people.

There is need to establish additional conservation areas in ecological zones which are poorly represented or unrepresented in the existing system (Fig. 2). These include the desert, arid, rainforest and montane forest zones (Fig. 1), some of which, e.g., rainforest and montane forest, are threatened by agricultural and forestry development (Hillman 1983, 1986b). Taking the rainforest zone as an example, two of the three existing reserves, Bire Kpatuas and Mbarizunga Game Reserves, are very small (less than 15 sq km) and even the largest, Bangangai Game Reserve (170 sq km) is not large enough to protect a representative portion of this important part of Sudan's natural environment. Urgent action is needed to ensure that Bangangai Game Reserve is not engulfed by the increasing human population around it. This should include a substantial increase in the size of the reserve, maintenance of an effective Wildlife Department presence, clear delineation of the reserve's boundaries, improved co-operation with the Forestry Department in management of the reserve, more effective fire management, adequate control of hunting, and the establishment of international co-operation with the relevant Zairian wildlife authority concerning activities on the Zaire border of the reserve (Hillman 1983).

An important area in the drier part of the savanna zone which has no conservation status at present is Jebel Marra, an unusual and isolated mountain on the northwestern edge of the savanna grassland zone (Fig. 2; No. 23). Jebel Marra has a unique ecosystem and is inhabited by several antelope species, including greater kudu and red-fronted gazelle on the upper slopes (Wilson 1979).

The development of a National Conservation Policy for the integrated development and conservation of Sudan's natural life-support systems, upon which the survival of both man and wildlife depends, should receive high priority (Hillman 1986b).

**Species Accounts**

In the following species accounts, various population estimates are given derived from aerial surveys such as those by Mehl-Babice (1983) in Jonglei, Fryxell (1985) in Boma, and Watson et al. (1977) for the whole country. These population estimates should be viewed cautiously, in light of the difficulty of observing many antelope species from the air, especially in woodland, and the large sampling errors often associated with low-intensity aerial surveys. Population estimates for most species in the Boma region, for example, have 95% confidence limits ranging from 60 to 100%. Comments under “Habitat, Food & Reproduction” include what is known about each species' habitat, food preferences, group size, dispersion pattern, seasonal movements, and reproduction in the Sudan. In many cases this information is based on anecdotal observations that may be of limited reliability.

**Bushbuck (Tragelaphus scriptus)**

*Distribution & Population:* Occurs in moderate numbers in suitable habitat throughout most of the Southern Region and in the savanna grassland zone in central Sudan (see map; Fig. 3). Very localised and in small numbers at the northern edge of its range (e.g., Wilson 1979). Numerous in the rainforest zone (Hillman 1983).

*Habitat, Food & Reproduction:* Found in a wide variety of habitats, including open and wooded grasslands, lowland, riverine, and montane forests and at the edge of swamps. Largely a browser, with some grass taken in the early wet season; fallen fruits are also eaten. Usually occurs alone or in small groups (3–10) are found where food is concentrated, such as a fruiting tree, or new growth after a fire. Sedentary.

*Status:* Not threatened. Bushbuck are frequently hunted for meat, but are able to persist even in cultivated areas provided small patches of bush cover remain.

*Conservation Measures Taken:* A protected species (Schedule III); the giant bushbuck of the Imatong Mountains is specially protected (Schedule II). Occurs in all national parks and game reserves. Boitani (1981) estimated a population of 270 in Southern National Park (probably an underestimate since bushbuck are difficult to census from the air).
Bongo (Tragelaphus eurycerus)

Distribution & Population: Confining to rainforest and the adjacent forest/savanna mosaic in Western Equatoria Province (Fig. 3). The total population is probably about 2000.

Habitat, Food & Reproduction: Lowland rainforest. Can be found in open and wooded grassland at the forest edge in the late dry/early wet seasons. Bongo feed on the leaves of forest trees, bushes, creepers and herbs. Early in the wet season they will move out of the forest and feed on the fresh growth of savanna trees and occasionally grasses. Group size up to 44, with an average of 8.3; males are often solitary. Groups of more than 5 animals almost always contain adult females and young, while groups of 5 or less comprise adults only. Mean group size 1.4 for all adult groups and 16.2 for groups containing juveniles. Males (often several at one time) join the larger groups of females and young.

Status: Rare, but not threatened as long as its rainforest habitat is maintained. Suffers little from hunting since many of the local Zande people believe that eating bongo meat causes leprosy.

Conservation Measures Taken. Specially protected (Schedule II). Occurs in Bangangai, Mburizunga and Bire Kpatuos Game Reserves. The population of Bangangai Game Reserve and its surroundings is probably 100-170 in the wet season, declining to less than 50 in the dry season when bongo are forced to leave because of the very limited supply of surface water.

Additional Remarks: A field study of this species has been carried out in the Sudan by Hillman (1983, 1986a). Bongo occur at relatively high population densities in the Sudanese rainforest, which is of major international importance for the conservation of this species. The rainforest is a valuable natural resource. It requires careful conservation and management, recommendations have been made in Hillman (1983).

Common Eland (Tragelaphus oryx)

Distribution & Population: The common eland reaches its northern limit in the Sudan. It is confined to the savannas and floodplains east of the Nile in Eastern Equatoria and Jonglei Provinces (Fig. 3). Watson et al. (1977) estimated a total population of approximately 10,000. The major concentration is in the Boma ecosystem, where there are about 4000.
Habitat, Food & Reproduction: This eland occurs in open, wooded and bushed grassland. It moves long distances in search of food, and can go for long periods without water. In the Boma ecosystem, the population is migratory, following similar routes to white-eared kob. Eland spend the dry season in Combretum broadleaf woodland and lightly wooded Acacia savannas in the northeast of the proposed Boma National Park, somewhat to the southeast of the kob's main dry season range. During the wet season, the eland population occurs in low rainfall savanna grasslands 100 to 150 km to the southwest, about 50 km beyond the southwestern boundary of the national park. The wet season range is also inhabited by kob, tiang and Mongalla gazelle. Common eland browse, eat small herbs in the grasslands, and take some young grass in the early wet season. Group size ranges from a few animals to large herds of over 50 individuals and occasionally several hundred. Young animals occur mainly in the larger groups. Adult males occur singly or in small groups of up to 4. They temporarily join the larger groups of females and young which often contain several males at a time.

Status: Among the less numerous antelope species in the Sudan, but not threatened at present. The main danger is poaching for meat.

Conservation Measures Taken: Specially protected (Schedule II). Occurs in Boma National Park and Badingilo and Kideto Game Reserves.

Giant Eland (Tragelaphus derbianus)

Distribution & Population: Giant eland occur only in the southwestern wooded savanna zone, west of the Nile and south of the Bahr el Arab (Fig. 3). The Sudan population of this species may be the largest remaining in Africa, estimated to be approximately 18,000 (predominantly in Bahr El Ghazal Province) by Watson et al. (1977).

Habitat, Food & Reproduction: Occurs mainly in wooded savannas, sometimes in open grassland. It is almost entirely a browser, but a small amount of young grass is eaten early in the wet season. Group size ranges from a few to 50 animals, and sometimes several hundred when the local food supply is sufficient. Calves occur only in the larger groups. Adult males occur singly or in small all-male groups and join the larger groups of females and young for periods ranging from a few hours to several weeks. Giant eland move over large areas in their search for food and can go for long periods without water.

Status: It is difficult to assess the status of the giant eland, since it occurs at low densities and is not easy to locate, moving continually through thick woodland with tall grasses. It is shy of people as it has always been hunted for meat. Poaching and rinderpest are the main dangers to its survival.

Conservation Measures Taken: Specially protected (Schedule II). A small population occurs in Southern National Park, where
Boitani (1981) estimated a population of about 120 within the national park and 160 in a larger survey area which included the national park and its surroundings (Fig. 2). Also occurs in Lantoto National Park, and Numatina, Chekkou and Boro Game Reserves.

Additional Remarks: In view of its small numbers elsewhere in Africa, effective conservation of this species in the Sudan is vitally important for its long-term survival.

**Sitatunga (Tragelaphus spekii)**

**Distribution & Population:** Occurs in most of the vast Sudd swamps of the Nile, and in small areas of swamp along rivers in the rainforest zone and adjacent savanna in Western Equatoria (Fig. 3). Total population unknown. Aerial censuses (Meht-Babtie 1983) gave mid-wet season and late dry season population estimates of 1100 sitatunga (probably underestimate by a factor of 2 to 3) in the Jonglei Canal survey area (Fig. 2), which includes most of this species' range in the Sudd swamps.

**Habitat, Food & Reproduction:** Restricted to swampy areas with tall reeds and papyrus for cover and areas of short grass for feeding. Much of the Sudd is probably unsuited to this species, comprising extensive, uninterrupted papyrus beds. Sitatunga feed on swamp grasses and other swamp vegetation, including bushes and trees. They will leave the swamp to graze on nearby grassland, especially on new growth in recently burned areas. In the Sudan, sitatunga usually occur alone or in pairs (female and young). Larger groups of 4 or 5 animals have been seen in Western Equatoria where the available habitat is limited.

**Status:** Occurs in reasonable numbers in the Sudan and conservation status is satisfactory at present. However, the sitatunga's status could quickly deteriorate because of its restricted distribution and susceptibility to hunting, especially in the small swamps in the southwest. The inaccessibility of the Sudd swamps provides some protection from hunting. Loss of habitat due to man's interference with swamp ecosystems is also a potential threat to this species.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Southern National Park and Zeraf, Fanyikang, Shambe and Bangangai Game Reserves.

**Greater Kudu (Tragelaphus strepsiceros)**

**Distribution & Population:** This species has a very localised distribution in Sudan, occurring in small numbers in the southeast, southwest, Jebel Marra and the northwest of Southern Darfur Province, and along the border of Ethiopia in the northeast (Fig. 3). Watson et al. (1977) estimated a total population of about 5-6000, mainly in the southeast. (We assume that the lesser kudu recorded for Red Sea Province by Watson et al. (1977) were in fact greater kudu—see distribution for these species in Yalden et al. 1984.) Wilson (1979) estimated a population of 200 on the
upper slopes of Jebel Marra, with a further 4–500 in the northwest of Southern Darfur.

**Habitat, Food & Reproduction:** Found in very dry bush country and wooded savanna, usually in rocky, hilly places. Greater kudu can go for long periods without water. A browser, but some grass may be taken when fresh regrowth is available after burning. Occur singly or in small groups of up to 10 individuals; adult males often solitary or in small, all-male groups.

**Status:** Rare. Survives well where human and livestock densities are not too great, e.g., within its range in Southern Darfur (Wilson 1979).

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Dinder and Boma National Parks, and Boro and Kidepo Game Reserves.

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**Lesser Kudu (Tragelaphus imberbis)**

**Distribution & Population:** Occurs in small numbers in the dry bush country of the southeast (Fig. 3).

**Habitat, Food & Reproduction:** Occurs in Acacia mellifera/A. polyacantha thickets, usually in flat or gently sloping areas (not hilly). Solitary (especially males) or in small groups of up to 6, occasionally larger. More than one male may occur in a group with females. Non-migratory.

**Status:** Rare.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in the southern part of Buma National Park (population less than 1000) and in Kidepo Game Reserve.

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**Blue Duiker (Cephalophus monticola)**

**Distribution & Population:** Occurs in good numbers in the forest areas of the southwestern border region and the Imatong and Dongotona Mountains on the southeastern border (Fig. 3).

**Habitat, Food & Reproduction:** Restricted to thick bush and forest, preferring areas with low trees or bushes and thick undergrowth to hide in. Blue duikers are browsers. They also eat fallen fruits, seeds and flowers of forest trees, and invertebrates, especially millipedes and termites. Usually occurs singly or in pairs, the male and female defending a territory.

**Status:** Satisfactory at present within its limited distribution. The future of this species depends on the survival of its forest habitats.

**Conservation Measures Taken:** Protected (Schedule III). Occurs in Lantoto National Park, and Bangangai, Bire Kpatuus and Mbarizunga Game Reserves.

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**Weyns' Duiker (Cephalophus weynsi)**

**Distribution & Population:** Red duikers occur in the Imatong end Dongotona Mountains and adjacent areas on the southern border (Fig. 3). Although usually ascribed to *C. harveyi* (= C. natinalensis harveyi), the museum specimens of red duikers from this region are in fact *C. weynsi* (P. Grubb, in litt. July 1986). Numbers unknown.

**Habitat, Food & Reproduction:** Occurs only in montane forest. A browser, it also feeds on fallen fruits and flowers. Usually solitary. Little studied, but the male and female probably defend a territory.

**Status:** Rare, or possibly vulnerable. There is considerable tea and forestry development in the area inhabited by this duiker, and much hunting of forest antelopes and primates for meat.

**Conservation Measures Taken:** Protected (Schedule III). Does not occur in any national parks or reserves.

**Conservation Measures Proposed:** An attempt should be made to conserve some area of the natural montane forests of the Lmatong and Dongotona Mountains, before it is too late. A study of the flora and fauna and their affinities with other montane areas of Africa would be valuable.

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**Red-flanked Duiker (Cephalophus rufilatus)**

**Distribution & Population:** Common in the forest and woodland areas west of the Nile in southwestern Sudan, mainly near the Zaire border (Fig. 3).

**Habitat, Food & Reproduction:** This duiker occurs along forest edges and in forest clearings, but not within thick forest. It requires bush or forest cover. The diet is highly varied, comprising mainly fallen fruits, seeds and flowers of forest trees, but also fresh and dry leaves, root tubers and carrion.

**Status:** Not threatened at present, although hunted widely with nets and dogs for meat.

**Conservation Measures Taken:** Protected (Schedule III). Occurs in Southern and Lantoto National Parks and Bangangai, Bire Kpatuus, Mbarizunga and Numatina Game Reserves.

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**Yellow-backed Duiker (Cephalophus silviculter)**

**Distribution & Population:** Restricted to forests in the southwest (Fig. 3), where it is fairly common.

**Habitat, Food & Reproduction:** Confined to thick forest areas, requiring dense cover and water. A browser, it also feeds on fallen fruits and flowers and root tubers; much of its time is spent searching for fruits beneath large forest trees. Solitary, or female with young. There have been few studies of this species, but each animal may be territorial, or a male and female may share a territory but be found separately within it.

**Status:** Rare. Often trapped for meat by the Zande, but remains fairly common within its very limited area of habitat in Sudan.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Bangangai, Bire Kpatuus and Mbarizunga Game Reserves.

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**Grey Duiker (Syriacapra grimmia)**

**Distribution & Population:** Widespread at low population densities in the southern Sudan (Fig. 3). Watson et al. (1977) estimated a total population of about 47 000 (over half in Bahr el Ghazal) from aerial surveys. Mefft-Batbee (1983) estimated a late dry season population of 234 in the Jumboge Canal survey area (Fig. 2). This species is difficult to census accurately from the air because of its small size and cryptic coloration and habits, and these figures are likely to be considerable underestimates.

**Habitat, Food & Reproduction:** Occurs in bush and woodland and in grassland where there is some bush cover. A browser, this duiker also feeds on fruits, seeds, insects, carrion and the nestlings of ground-dwelling birds. Found in pairs or alone and probably territorial; small groups occur in the mating season.

**Status:** Not threatened. Persists in cultivated areas with only a small amount of bush cover.

**Conservation Measures Taken:** Protected (Schedule III). Occurs in Southern National Park, where Poitani (1981) estimated a population of 500, and in all the other national parks and reserves except Dinder National Park and Zeraf and Fanyikang Game Reserves.

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**Waterbuck (Kobus ellipsiprymnus)**

**Distribution & Population:** The subspecies *K. e. defassa* occurs widely at low densities over most of the southern Sudan and along the eastern border (Fig. 3), especially where there are rivers and permanent water. Watson et al. (1977) estimated a total population of 35 000. Mefft-Batbee (1983) estimated 8800 in the Jumboge survey area.

**Habitat, Food & Reproduction:** Occurs in grassland areas near water within open, wooded or bushed grassland or swamps. Always found near water. Occurs in tall grass areas in the Boma ecosystem, where it is frequently associated with Hyparrhenia grasses. Purely a grazer, feeding on riverine and swamp-margin grasses. Waterbuck herds range from 5 to 20 individuals and
usually consist of an adult male, several adult females and their young. Young males form all-male groups; old males are often solitary. Waterbuck are non-migratory.

**Status:** Not threatened, although often hunted for meat.

**Conservation Measures Taken:** Protected (Schedule III). Occurs in all the national parks and game reserves with the possible exception of Ashana Game Reserve. The population is about 2500 in Southern National Park (Boitani 1981) and less than 1000 in Boma National Park. The population in Dinder National Park has been reduced to low levels (Allam 1981).

**White-eared Kob (Kobus kob leucotis)**

**Distribution & Population:** This subspecies, which differs markedly from other subspecies of *K. kob* in coloration and social organisation, is confined to the southeastern Sudan (Fig. 3) and a small adjacent area in Ethiopia. It is the most numerous antelope in the Sudan. Watson et al. (1977) estimated a total population of about 1.25 million. The major concentration is in the open plains and lightly wooded savannas on nutrient-rich soils at the base of the Boma escarpment. This population exceeded one million animals prior to a decline of 40% in 1980 during drought, and has since stabilised at about 840,000 (Fryxell 1983). Meiff-Babbie (1983) estimated populations of between 2000 (late wet season) and 11,700 (late dry season) in the Jonglei Canal survey area (Fig. 2), but those on the west bank of the Nile were in all probability Uganda kob.

**Habitat, Food & Reproduction:** Occurs in open and wooded grasslands, generally preferring open grasslands often with shade trees nearby. Always occurs within 10 km of water. The high clay-content, black-cotton soils (chromozems) which cover most of the plains in the Boma ecosystem seal quickly after the onset of the rains. Subsequent rainfall pools on the surface, making much of the grasslands inaccessible to grazing antelope such as kob and tiang. When the rains begin in May the Boma kob population massses into large groups and begins the southwest journey of 150 to 200 km to the wet season range (Fig. 2). The kob population spends the wet season (July–September) in savanna grasslands with medium height grasses (e.g., *Sporobolus, Heteropogon, Panicum*, and *Setaria* spp.) on free-draining soils in a relatively low rainfall area in the southwest of the ecosystem (Fig. 2), about 50 to 75 km southwest of the proposed Boma National Park. The kob begin to migrate northeastwards in the late wet season (September–October). They spend the dry season (January–April) in ephemeral swamps, chiefly with *Hyparrhenia* and *Echinochloa* grasses, in the north and east of the national park. White-eared kob are purely grazers.

Dense aggregations are formed at all times of the year in feeding areas (more than 1000 per sq km), with local densities of about 100 per sq km when the animals are more widely dispersed in wooded areas. The herd is most cohesive during the wet season, particularly during migration, covering some 1500 sq km. It spreads out to cover about 3000 sq km during the dry season. Mating peaks during January–May, with peak calving in September–December. In the Boma region, white-eared kob have a lek mating system. The gestation period is apparently about 240 days.

**Status:** The population is currently stable, but is potentially threatened by three factors: loss of dry season habitat in an area of oil exploration, competition with livestock for scarce forage during the dry season, and intense hunting pressure from local tribesmen. Traditional hunting of white-eared kob has always occurred at Pibor every year when the migration crosses the river. This should not be a threat to the kob population as long as only traditional weapons are used, but the use of automatic weapons by poachers in vehicles would be much more serious. At present, the two factors affecting resource availability in the dry season may represent more serious problems than hunting.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Boma National Park, and Badingilo, Shumbe and Zeraf Game Reserves.

**Additional Remarks:** A field study of white-eared kob and the Boma ecosystem has been carried out by Fryxell (1985). This antelope and the other migratory species provide a superb example of adaptation to a habitat that varies greatly between seasons. The enormous migratory concentrations are both one of the world's great wildlife spectacles and a valuable source of protein to the local people. Effective conservation and management of white-eared kob deserves high international priority.

**Uganda Kob (Kobus kob thomasi)**

**Distribution & Population:** Widespread in the southwestern Sudan, mainly west of the Nile (Fig. 3). Occurs in good numbers, especially near the Nile.

**Habitat, Food & Reproduction:** Inhabits open and wooded grassland areas, usually near water. A grazer. Group size ranges from 10 to 50 individuals, usually females and young with one male, with smaller all-male herds. Males defend territories in the mating season. Large groups of 100 or more kob are formed when food is abundant. This kob is non-migratory.

**Status:** Satisfactory; hunted for meat by some tribes.

**Conservation Measures Taken:** Protected (Schedule III). Boitani (1981) estimated a small population (430) in Southern National Park but larger numbers (10,000) in the total survey area centred on this national park (Fig. 2). Kob also occur in Nimule and Lantoto National Parks, and Mchsha, Ashana, Numatina, Chelkou and Boro Game Reserves.

**Nile Lechwe (Kobus megaceros)**

**Distribution & Population:** Restricted to two areas, with the main population in the Sudu swamps and a small population in the Machar marshes of Upper Nile Province near the Ethiopian border (Fig. 3). This species is confined to the Sudan, apart from a very small population just across the border in southwestern Ethiopia. Censuses by Watson et al. (1977) and Meiff-Babbie (1983) suggest a total Sudan population of 30–40,000, nearly all in the Nile Sudu area with about 900 in the Machar marshes.

**Habitat, Food & Reproduction:** Nile lechwe occur in swamps and flooded "toich" (Dinka) grasslands. They feed on grasses and a few other swamp plants and occur in groups of up to 50 individuals, or up to several hundred in areas of good swamp such as Lakes Yirri and Nyibor. Herds of females and young may contain more than one adult male; there are also all-male bachelor groups.

**Status:** Satisfactory at present, but potentially vulnerable because they occur largely in one area. It is not known what impact the Jonglei Canal will have on their habitat in the Sudu swamps, but it may have little or no effect on the west bank where most of the lechwe occur. The inaccessibility of their habitat provides considerable protection against hunting.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Zeraf, Fanyikang and Shambe Game Reserves. Zeraf Game Reserve covers 37% of the Sudu swamps ecological zone. **Additional Remarks:** The Sudu swamps contain well over 95% of the world population of Nile lechwe, along with other unique species such as the shoe-hilled stork (*Balaeniceps rex*). These swamps comprise an ancient, major world swamp system which is very little known or understood. Their conservation and wise management are a priority.

**Bohor Reedbuck (Redunca redunca)**

**Distribution & Population:** The bohor reedbuck is widespread at low densities throughout most of the savanna and floodplain grassland zones of the central and southern Sudan (Fig. 3). Watson
et al. (1977) estimated a total population of 80,000. The largest numbers occur in the floodplain grassland zone in Jonglei Province where there are substantial migratory populations; Watson et al. estimated a total of about 38,000 for the entire province. Meit-Bakht (1983) estimated a late dry season population of 33,500 in the Jonglei Canal survey area (Fig. 2), compared to 7500 in the mid wet season when most reedbuck had left the area. There is a migratory population of about 13,000 in the Boma ecosystem.

**Habitat, Food & Reproduction:** Occurs in open, wooded and bushed grassland and near swamps, in long and short grass areas, usually within 10 km of water. Often associated with patchy areas of full grass in the Boma ecosystem, where it occupies a wide variety of dry season habitats from open grasslands to broadleaf woodlands, mainly in the northern half of the proposed national park. In the wet season, this population migrates 50 to 75 km southwards to the lightly wooded *Acacia zanzibarica* savannas in the south of the national park and beyond, returning north in the late wet/early dry season. The bohor reedbuck is a grazer. It is solitary or occurs in pairs or small groups of 3 to 5 animals (usually solitary or in pairs in Boma) comprising a male, one or two females and their young; young males may stay together in small groups. In the Boma ecosystem it forms large amorphous groups during migration and in the wet season.

**Status:** Has probably suffered a considerable reduction in numbers and contraction in range throughout the northern area of its occurrence in the Sudan, because of habitat degradation by large numbers of domestic livestock, and drought. However, it still occurs locally in moderate numbers in some of these areas (e.g., Wilson 1979). Its status is satisfactory in the Southern Region.

**Conservation Measures Taken:** Protected (Schedule III). Occurs in all national parks and game reserves except those in the rainforest zone (Bangangai, Bire Kpatuos and Mbarizanga). In contrast to the large population in Boma National Park, there is a much smaller population (about 700) in Southern National Park in the wooded savanna zone (Boitani 1981).

**Mountain Reedbuck (Redunca fulvorufa)**

**Distribution & Population:** Confined to hilly areas of Eastern Equatoria Province (Fig. 3), such as the Imatong Mountains, where it occurs in small numbers.

**Habitat, Food & Reproduction:** Occurs in broken, hilly country. A grazer, this reedbuck may also browse occasionally. Occurs in groups of up to 10 to 15 individuals.

**Status:** Rare.

**Conservation Measures Taken:** Specially protected (Schedule II). Possibly occurs in Kidepo Game Reserve.

**Roan (Hippotragus equinus)**

**Distribution & Population:** Widespread at low densities in the savanna and floodplain zones of the southern Sudan and eastern border region (Fig. 3). Watson et al. (1977) estimated a total population of about 55,000, predominantly in the Southern Region. Meit-Bakht (1983) estimated a maximum population of 4100 (late dry season) in the Jonglei Canal survey area (Fig. 2).

**Habitat, Food & Reproduction:** Occurs in open and wooded grassland, in both tall and short grass areas. In Boma National Park, roan are found mainly in the relatively densely wooded broadleaf *Combretum* savanna in the northeastern quarter of the park, and in the lightly wooded *Acacia* savannas in the northwest. Roan are almost entirely grazers, but occasionally browse. Usually occur in pairs or small groups of up to 20. Females and young are accompanied by a single male. Other males occur in all-male bachelor herds; old males may be solitary. In the Boma region, groups of 10 to 20 occur in the wet season but groups are smaller in the dry season. Roan generally occur near permanent water but can go for several days without drinking. They will move long distances to find good grazing in the dry season, but are apparently non-migratory in the Boma ecosystem.

**Status:** Roan populations have probably declined in the northern parts of the species’ range in the Sudan, because of overgrazing by domestic livestock and hunting, e.g., Wilson (1979). It is not particularly threatened in the Southern Region, although there may be some poaching for meat.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in moderate numbers in the Southern National Park (population about 1000); Boitani 1981) and Boma National Park (population about 2000). Also occurs in Dinder National Park, where it is relatively numerous (Allam 1981), Nimule and Lantoto National Parks, and Badingilo, Mestha, Juba, Ashana, Numatina, Chelkou, Boro and Kidepo Game Reserves.

**Belsa Oryx (Oryx gazella belsa)**

**Distribution & Population:** In Sudan this species is confined to two small areas: near the Kenya border in the extreme southeast, and along the Ethiopia border in the northeast (Fig. 3). Watson et al. (1977) estimated a total population of 14,000, largely in Eastern Equatoria. There are probably 2 to 4000 in the Boma area, mainly in the Kurun River area immediately south of the Boma Plateau.

**Habitat, Food & Reproduction:** Occurs in arid and semi-arid grasslands and savannas, including open and lightly wooded *Acacia zanzibarica* grasslands in the southern part of Boma National Park. Water is apparently not a limiting factor to this species’ distribution. Belsa oryx are mainly grazers but will browse when grass is scarce or very dry. They also dig for roots and tubers using their feet. Group size varies from 5 to more than 40; males are often solitary. Herds of females and young usually include only one adult male. Will move long distances in search of food, but non-migratory in the Boma ecosystem.

**Status:** Satisfactory at present. Occurs in good numbers in the southeast but its very limited distribution makes it potentially vulnerable.

**Conservation Measures Taken:** Specially protected (Schedule II). Occurs in Boma National Park (population about 1000) and Kidepo Game Reserve.

**Scimitar-horned Oryx (Oryx dammah) and Addax (Addax nasomaculatus)**

**Distribution, Population & Status:** These two species formerly reached the eastern limits of their distributions in the desert zone of the Sudan, west of the Nile (Fig. 3). They were quite common in Northern Darfur in the early 1900s but their populations were decimated by hunting with firearms (Happold 1966). Their present distribution and numbers in the Sudan are little known; they may no longer occur as resident species but as part of populations which move between Chad and the Sudan. Both species are highly endangered. There are no conservation areas in the desert and arid zones, which cover most of the northern half of Sudan (Fig. 1).

**Lelwel Hartebeest (Alcelaphus buselaphus lelwel)**

**Distribution & Population:** Widespread and quite common in the Southern Region, extending north to Southern Darfur in the west (Fig. 3). Watson et al. (1977) estimated a total population of 157,000, with the largest estimated numbers in Jonglei (47,000) and Bahr el Ghazal (46,000). Meit-Bakht (1983), however, estimated a maximum population of only 234 in their Jonglei survey area (Fig. 2). Higher densities must therefore occur in Jonglei Province away from the Nile ecosystem.

**Habitat, Food & Reproduction:** Occurs in open, bushed and wooded grasslands. In the Boma region, found mainly in *Combretum*
broadleaf woodland or wooded grasslands, with *Hyparrhenia* the
dominant grass; shows similar habitat preferences to tiang in
many areas. Exclusively a grazer. Hartebeest occur in herds of 5
to 40 individuals, with smaller groups in woodlands and larger
groups in open grasslands. Males are usually territorial, accom-
panying groups of females and young while they are in the territory
but remaining there when the females depart. Younger males
occur in all-male bachelor herds. Hartebeest are dependent on
water, but can go for several days without drinking. This species
is probably non-migratory in the Boma ecosystem and elsewhere.
Calving possibly peaks in the early wet season (Boma).
*Status:* Not threatened, although in the Boma region hartebeest
may be more exposed to hunting pressure than other large antelopes,
due to their wide dispersion in small groups, heavily wooded
habitat, and close proximity to local people. This species has
persisted in greater numbers than other large antelopes in
Southern Darfur (Wilson 1979).
*Conservation Measures Taken:* Protected (Schedule III). Well
represented in several conservation areas, e.g., Boma National Park,
where the population is at least 17,000 and probably of the order
30-50,000, and Southern National Park, where it is the most
numerous antelope with a population of about 8,000 (15,000 in
the entire census area; Boitani 1981). It occurs in all other national
parks except Dinder, and in all game reserves except those in the
swamp (Zeraf, Fanyikang) and rainforest (Hangangai, Bire Kpatu
os and Mbarizungu) zones.

**Tora Hartebeest (Alcelaphus buselaphus tora)**

*Distribution & Population:* This hartebeest formerly occurred along
the Ethiopia border in Blue Nile and Kassala Provinces (Fig. 3).
It is not known how much of its former range it still occupies.
Watson et al. (1977) estimated a hartebeest population (presump-
tively this subspecies) of about 400 in Blue Nile Province.

*Habitat, Food & Reproduction:* Occurs in savanna grasslands.
Feeding and social organization probably similar to lelwel
hartebeest.

*Status:* Threatened by loss of habitat to agricultural development,
habitat degradation resulting from overgrazing by domestic live-
stock and aggravated by drought, and excessive hunting.

*Conservation Measures Taken:* Specially protected (may only be
hunted by special license), but this protection is not enforced.
Formerly occurred in Dinder National Park, the only conserva-
tion area within its range in the Sudan, but disappeared from this

**Tiang (Dama
ticus lunatus tiang)**

*Distribution & Population:* The tiang, which is the local race of
the topi, is widespread in the savanna grassland, wooded savanna
and floodplain zones of the Sudan, apart from the more heavily
wooded savannas along the Zaire and Central African Republic
boundaries in the southwest (Fig. 3). It is the second most numerous
antelope in the country; only the white-eared kob occurs in greater
numbers. Watson et al. (1977) estimated a total population of
714,000, predominantly in Jonglei, Upper Nile, Eastern Equa-
torlia and El Buheyrat Provinces in the Southern Region.

The largest concentration occurs on the east bank of the Nile
in Jonglei Province. Meft-Babtie (1983) estimated a late dry
season population of 360,000 in the Jonglei Canal survey area
(Fig. 2), decreasing to 35,000 in the mid wet season when most of
the population migrates out of the area. A substantial propor-
tion of the Jonglei tiang migrate to the same wet season range as
the Boma white-eared kob population—a total distance of 400
km (Fig. 2). At least 130,000 tiang move into this area in the wet
season. An additional population of approximately 28,000 occurs
in Boma National Park.

*Habitat, Food & Reproduction:* The Jonglei tiang occur mainly
in open floodplain grassland, but also in bushed and wooded
grassland, and in swamp grassland. The Boma population’s dry
season range comprises mainly *Combreton* and *Acacia zanzibarica*
wooded grasslands in the eastern half of the national park.
They occur frequently in recently burned areas with a green flush
of new grass. The Boma population migrates 100 to 150 km south
and southwest to the wet season range, which is low rainfall
savanna grassland with medium to tall grasses (*Hyparrhenia, Pan-
ticum*), extending further to the east than the kob’s wet season
range. Tiang are exclusively grazers.

During the dry season tiang occur in groups of 10 to 30, with
some individuals not uncommon. Males form separate groups
from females and young. During the southward migration, and
persisting throughout the wet season, tiang occur in dense herds
of several hundred to more than 1000 which may be breeding
aggregations. Males defend a small territory in the mating season.
Meft-Babtie (1983) found that the majority of tiang calves are
born in the dry season, in a 6-week period between mid-February
and late March.

*Status:* Tiang numbers have declined greatly throughout the
northern part of their Sudanese range due to habitat destruction
by man and his livestock and overhunting, e.g., it has been re-
duced to small numbers in Southern Darfur (Wilson 1979). The
species’ status is satisfactory at present in the Southern Region,
but the cutting of the main migration route in Jonglei by the
Jonglei Canal may have an adverse effect on the tiang in that
area. The Boma population may be exposed to heavy hunting
pressure, due to its year-round proximity to local tribesmen.

*Conservation Measures Taken:* Protected (Schedule III). Occurs
in Dinder National Park, where the population has been reduced
to low levels by poaching, disease and the loss of wet season range
outside the park to agricultural development (Allam 1981; Whit-
tney & el Moghraby 1982). Also occurs in Southern and Boma
National Parks and Badingilo, Zeraf, Fanyikang, Meshra, Kidepo,
Shambe, Ashana, Numatina, Cheikou and Boro Game Reserves.

*Additional Remarks:* A field study of tiang in Jonglei has been
carried out by S. Cobb (in Meft-Babtie 1983). Sudan has the
world’s largest population of *D. lunatus* and its conservation
management is of international significance.

**Klipspringer (Oreotragus oreotragus)**

*Distribution & Population:* Occurs in small numbers in the south-
east, on the borders with Ethiopia, Kenya and Uganda, and in the
Red Sea hills in the northeast (Fig. 3).

*Habitat, Food & Reproduction:* Restricted to rocky hills with a
sparse vegetation of grass, small bushes and trees. Mainly a brows-
er; also takes some grass. Can survive without drinking. Usually
occurs in territorial male/female pairs, with their young.
Other males are solitary.

*Status:* Rare.

*Conservation Measures Taken:* Protected (Schedule III). Occurs
in Boma National Park and Kidepo Game Reserve.

**Guenther’s Dikdik (Madoqua guentheri)**

*Distribution & Population:* Confined to the southeast, from the
Nile to the Uganda, Kenya and Ethiopia borders (Fig. 3). Occurs
in good numbers within this range.

*Habitat, Food & Reproduction:* Found in dry bush and bushed
grassland areas with suitable cover provided by low thick under-
growth. A browser; also digs for roots and tubers with its
hooves. Can survive without surface water. Occurs in pairs, a
male and female, which defend a territory. The young accompany
their parents for a few months after birth.

*Status:* Not threatened at present within its small area of occur-
rence in the Sudan.
Conservation Measures Taken: Protected (Schedule III). Occurs in Boma National Park and Kidepo Game Reserve.

Salt's Dikdik (*Madoqua saltiana*)

**Distribution & Population:** Occurs in a small area of northeastern Sudan (Fig. 3). Population unknown.

**Habitat, Food & Reproduction:** Inhabits arid thornbush and semi-desert. Average group size 1 to 2; territorial.

**Status:** Probably satisfactory. There are no conservation areas within this species' range in the Sudan.

Oribi (*Ourebia ourebi*)

**Distribution & Population:** Occurs widely at low population densities in the savanna grassland, wooded savanna and floodplain zones (Fig. 3). Occurs in very small numbers and limited localities in the northern part of its distribution (e.g., Wilson 1979). Watson et al. (1977) estimated a total population of 38,000, with the largest numbers in Jonglei, El Buheyarat and Bahr el Ghazal Provinces. Melit-Babtie (1983) estimated a late dry season population of 6000 in the Jonglei Canal survey area (Fig. 2).

**Habitat, Food & Reproduction:** Found in open and wooded grassland. Occurs mainly in Combretum broadleaf woodland and wooded grasslands in the Boma area, where it is also seen occasionally in Acacia wooded grasslands. Purely a grazer. Occurs in pairs or family groups; the male and female defend a territory. Apparently non-migratory, but may move to higher ground during the rains.

**Status:** The oribi's numbers have probably declined in the northern part of the savanna grassland zone because of habitat destruction by large numbers of domestic livestock. It is not threatened in the Southern Region.

Conservation Measures Taken: Protected (Schedule III). Oribi are found in all national parks and game reserves, except Bangangai, Zeraf, Bire Kpatuus and Mbarizunga Game Reserves, generally in small to moderate numbers, e.g., 500 in Southern National Park (Boitani 1981), 2000 in Boma National Park (these figures are probably underestimates, since oribi are secretive and difficult to view from the air in wooded habitats).

Grant's Gazelle (*Gazella granti*)

**Distribution & Population:** Confined to the extreme southeast (Fig. 3). The aerial censuses by Watson et al. (1977) suggested a total population of this gazelle of the order 16–20 000.

**Habitat, Food & Reproduction:** Found in open to bushy grasslands in low rainfall areas. In Boma National Park, restricted to the relatively arid bushed grasslands with scattered patches of low-growing Acacia melleifera, A. polycantha and Combretum sp. in the southern section of the park. A mixed feeder. Occurs in small herds of 5 to 30 individuals (less than 5 in Boma) which consist of an adult male and several females and their young. Other males form bachelor herds. Grant’s gazelle is non-migratory in the Boma area.

**Status:** Not threatened at present within its very limited range in the Sudan.

Conservation Measures Taken: Protected (Schedule III). Well represented in the proposed Boma National Park (population about 3000), and also occurs in Kidepo Game Reserve.

Mongalla Gazelle (*Gazella thomsonii albonotata*)

**Distribution & Population:** Occurs in the southeast in good numbers, east of the Nile in the floodplain zone and adjacent savanna grassland (Fig. 3). The estimates by Watson et al. (1977) suggest a total population of about 300 000. Melit-Babtie (1983) estimated a late dry season population of 66 000 in the Jonglei Canal survey area, declining to about 1000 in the mid wet season because of emigration and increasing to 55 000 in the late wet season as the gazelles returned. The population of the Boma ecosystem (about 20 000) follows a similar migration pattern to white-eared kob, with wet and dry season ranges adjacent to but barely overlapping those of kob. A larger population of Mongalla gazelle (at least 70 000) occurs to the west of the Boma ecosystem; part of this population shares the wet season range utilised by kob and tiaang.

**Habitat, Food & Reproduction:** Lives mainly in open grassland. In the Boma ecosystem, the dry season range comprises open to lightly wooded grasslands in the northern half of the proposed national park; it frequently occurs in association with Acacia zanzibarica tree cover and Hyparrhenia grasses and is often seen in burn areas with a green flush. The wet season range of the Boma population is savanna grassland with medium to tall grasses in a low rainfall area in the south of the national park. This gazelle is mainly a grazer, but also browses in the dry season when grass quality is low. Females form groups of more than 5; males are territorial. Young males may form bachelor herds. Occasional groups of more than 30 individuals occur in prime feeding areas, e.g., burn. Gathers in high population densities during the wet season (several hundred per sq km) when it is often associated with other migratory grazers, e.g., kob, zebra (*Equus burchelli*), or tiaang. Most young may be born in the early wet season.

**Status:** Satisfactory. The population in the Boma ecosystem is apparently stable and is probably not exposed to serious hunting pressure since this species is timid and is usually distant from people.

Conservation Measures Taken: Protected (Schedule III). Occurs in Boma National Park and Badingilo Game Reserve.


**Distribution & Population:** Little is known about the precise current distribution in the Sudan of these northern gazelles. Their former distributions are indicated in Fig. 3. Dama gazelle occurred widely in the arid zone and the central and southern parts of the desert zone, to the west of the Nile. Dorcas gazelle occurred in the desert and arid zones on both sides of the Nile, to the Red Sea coast in the east. Slender-horned gazelle occurred in the northwestern desert, although the limits of its distribution are unknown. Red-fronted gazelle have a more southerly distribution, occurring in the southern arid zone and northern savanna grassland zone on both sides of the Nile and the northwestern part of the wooded savanna zone in central-western Sudan. Heuglin’s gazelle (*G. rufifrons tilonura*), the race of the red-fronted gazelle which occurs east of the Nile along the Sudan/Ethiopia border, is strongly demarcated from other subspecies of *G. rufifrons* and is sometimes regarded as a distinct species. Soemmerring’s gazelle occurs east of the Nile in the arid zone and northeastern savanna grassland zone.

Aerial censuses by Watson et al. (1977) showed that gazelles occur widely at very low densities in the desert, arid and northern savanna grassland zones of the Sudan. They estimated a total population of about 25 000 gazelles (all species combined) in the northern areas to the west of the Nile (Northern, Northern and Southern Darfur, Northern and Southern Kordofan Provinces), where the species occurring probably included dorcas (northerly section), dama, red-fronted (southerly section) and possibly slender-horned. The total gazelle population estimated by Watson et al. (1977) in the northern Sudan to the east of the Nile (Red Sea, Kassala and Blue Nile Provinces) was about 6500; the species occurring here may have included dorcas (northerly section),
Soemmerring’s and red-fronted (southerly section). At least two gazelle species, probably dorcas and Soemmerring’s, are known to occur at present in the Red Sea hills area. The combined population density of all gazelle species in the northern provinces ranged from less than 0.01 to 0.05 per sq km (Watson et al. 1977). Status: Lack of information precludes an accurate assessment of the current status of these gazelles. All species have undoubtedly suffered considerable reductions in their numbers as a result of decades of uncontrolled hunting with firearms and severe habitat degradation caused by man and his domestic animals, accentuated by recent droughts. Dama gazelle and slender-horned gazelle (if it still occurs) are certainly threatened. Dorcas gazelle probably occupies much of its former range but in greatly reduced numbers. Red-fronted gazelle is still widespread in moderate numbers within its former area of occurrence, e.g., it has maintained its numbers and range in Southern Darfur to a greater degree than most other antelopes and likely will continue to survive precariously for some time (Wilson 1979).

Conservation Measures Taken: The wildlife of the desert and arid zones of the Sudan has no protection at present. Red-fronted gazelle occurs in Dinder National Park within the savanna grassland zone in Blue Nile Province. Soemmerring’s gazelle formerly occurred in this national park but has now been extirpated there by poaching and loss of wet season range outside the park (Allam 1981).

Conservation Measures Proposed: The extensive desert and semi-desert areas of the northern Sudan are an internationally important habitat for gazelles, and for other species such as Nubian ibex (Capra ibex nubiana) and Barbary sheep (Ammotragus lervia). These areas are a priority for conservation action (Hillman 1986b). Conservation areas may be impractical in such habitats because of the very low population densities and widely scattered occurrence of wildlife species. An exception may be in the Red Sea hills, where protection of arid-zone wildlife could be linked to preservation of scenery and a marine conservation area, providing a basis for tourism. Conservation in the western and northwestern deserts will have to concentrate on protection of the wild species where they occur, rather than in specific conservation areas. An education programme and control of firearm use will be necessary. These are difficult prospects in such remote, sparsely populated border areas.

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References

Chapter 4: Ethiopia

J.C. Hillman

Introduction
Ethiopia consists of two vast highland plateaux, separated by the Rift Valley and surrounded by arid lowlands (Fig. 1). The deeply dissected and often mountainous highlands comprise about 40% of the country. They are well watered and very fertile and have been densely populated by peasant farmers for millennia. Consequently the broadleaved and Juniperus/Podocarpus forests which formerly covered the highlands are now restricted mainly to the southwest of the western highlands and the Bale and Arasi Mountains in the eastern highlands. Habitat destruction, uncontrolled hunting, and the pressures of agricultural settlement have eliminated large wild mammals from most of the highlands.

The remaining wildlife occurs mainly in the relatively thinly populated lowlands and at the highest extremities of the mountains in Bale and Simien. Antelopes and other large mammals have suffered severely in the past from the effects of overhunting by the heavily armed local populace, military operations (particularly in the east and north), habitat destruction caused by the activities of increasing populations of both nomadic pastoralists
fauna (Table 1). A few species still persist in low numbers among the rocky, scrub-covered foothills and/or in some of the more remote, sparsely populated regions of the highlands, e.g., greater kudu, bushbuck, waterbuck, bohor reedbuck, oribi, klipspringer, and grey duiker, but the only highland areas with substantial remnants of wildlife are the Simien Mountains in the north and the Bale and Arsii Mountains in the southeast. Klipspringer are locally abundant in the Simien Mountains (Dunbar 1978). This area also provides a refuge for substantial populations of bushbuck and grey duiker, as well as two of Ethiopia’s seven larger endemic mammals, the walia ibex (Capra walie) and gelada baboon (Ptheropithecus gelada). The Bale Mountains are the last stronghold of two of Ethiopia’s other large endemic species of mammals, the mountain nyala and Simien fox (Canis simensis), with klipspringer, grey duiker, bohor reedbuck and Menelik’s bushbuck also well represented. The only Cephalophus duiker known from Ethiopia was discovered recently in the Bale Mountains.

Three broad biotic zones can be distinguished within Ethiopia’s peripheral lowlands: the northern and eastern lowlands, southern lowlands and Rift Valley, and western lowlands (Bolton 1973b). The northern and eastern lowlands (Eritrea, Danakil, Ogaden) are the driest regions of the country. They comprise foothills, lava ridges, and flat, lava-strewn plains containing desert, open grassy steppe and Acacia thornbush. The major surviving concentration of wildlife in these regions is in the semi-arid Acacia savanna and thornbush of the Awash River valley, where beisa oryx and Soemmerring’s gazelle are abundant (several thousand head), greater and lesser kudu, gerenuk and waterbuck are common, and other species such as mountain reedbuck occur in smaller numbers (Bolton 1973b). Viable remnants of beisa oryx, dorcas and Soemmerring’s gazelles, gerenuk, Salt’s dikdik, and the endangered Somali wild ass (Equus asinus somalica) persist in central and southern Danakil. The eastern plains (Ogaden) are largely covered in Acacia-Commiphora thornbush. This region’s formerly large herds of antelope have been reduced to scattered remnants but species characteristic of the Horn of Africa, such as beisa oryx, Soemmerring’s gazelle, dibatag, gerenuk, and Salt’s and Guenther’s dikdiks still occur widely.

Dense Acacia-Commiphora bush extends westward from the Ogaden through Borana (southern Sidamo Province) to the Omo River valley, and into the southern part of the Rift Valley as far north as the Lake Abaya region. Within this southern zone there

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**Table 1**

**Current Status of Antelopes in Ethiopia**

<table>
<thead>
<tr>
<th>Species</th>
<th>Status</th>
<th>Species</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bushbuck</td>
<td></td>
<td>Leiwel Hartbeest</td>
<td></td>
</tr>
<tr>
<td>Mountain Nyla</td>
<td>R</td>
<td>Topi</td>
<td></td>
</tr>
<tr>
<td>Greater Kudu</td>
<td></td>
<td>Klipspringer</td>
<td></td>
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<tr>
<td>Lesser Kudu</td>
<td></td>
<td>Salt’s Dikdik</td>
<td></td>
</tr>
<tr>
<td>Common Eland</td>
<td>R</td>
<td>Guenther’s Dikdik</td>
<td></td>
</tr>
<tr>
<td>“Red” Duiker (sp. indet.)</td>
<td>K</td>
<td>Beira</td>
<td></td>
</tr>
<tr>
<td>Grey Duiker</td>
<td></td>
<td>Oribi</td>
<td></td>
</tr>
<tr>
<td>Waterbuck</td>
<td></td>
<td>Gerenuk</td>
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</tr>
<tr>
<td>White-eared Kob</td>
<td>R</td>
<td>Dibatag</td>
<td>K</td>
</tr>
<tr>
<td>Nile Lechwe</td>
<td></td>
<td>Soemmerring’s Gazelle</td>
<td>S</td>
</tr>
<tr>
<td>Bohor Reedbuck</td>
<td>S</td>
<td>Grant’s Gazelle</td>
<td>S</td>
</tr>
<tr>
<td>Mountain Reedbuck</td>
<td>R</td>
<td>Dorcas Gazelle</td>
<td>S</td>
</tr>
<tr>
<td>Roan</td>
<td>V</td>
<td>Red-fronted Gazelle</td>
<td>K</td>
</tr>
<tr>
<td>Beisa Oryx</td>
<td>S</td>
<td>Speke’s Gazelle</td>
<td>En</td>
</tr>
<tr>
<td>Swaine’s Hartbeest</td>
<td>V</td>
<td>Mongalla Gazelle</td>
<td>K</td>
</tr>
<tr>
<td>Tora Hartbeest</td>
<td>I</td>
<td></td>
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</tr>
</tbody>
</table>

* S – endangered; R – rare; V = vulnerable; I = indeterminate (i.e., endangered, rare, or vulnerable); K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.
are several areas of open grassland or short-grass *Acacia* savanna, notably in the Omo Valley and east of Lakes Chamo and Abaya (Bolton 1973b). *Acacia* savanna and woodland predominate north of Lake Abaya, but this part of the Rift Valley is extensively cultivated. The southern lowlands and Rift Valley receive a higher rainfall than the eastern lowlands and the fauna includes species not found in the eastern lowlands, e.g., Grant's gazelle, lewel hartebeest, eland, oribi, and topi. The major surviving wildlife concentrations are in the inaccessible, sparsely populated lower Omo and Mago Valleys, which contain the most species-rich large mammal communities remaining in Ethiopia (Brown 1970; Bolton 1976). The plains to the west of the Omo River support seasonal concentrations of several thousand topi and hundreds of eland, beisa oryx, and Grant's gazelle (Urban & Brown 1968; Baba et al. 1982). The largest remaining populations of Swayne's hartebeest, a distinctive subspecies now confined to Ethiopia, occur on the grassland plains of Senekel, west of Lake Awasa, and Nechisar, between Lakes Chamo and Abaya (Bolton 1973a; Lewis & Wilson 1977).

The western lowlands receive the highest rainfall of Ethiopia's lowland regions. The vegetation comprises mainly deciduous, broad-leaved *Combretum-Terminalia* savanna and woodland. The roan antelope occurs only in this part of Ethiopia. The Gambella Salient in the southwest contains an eastward extension of the floodplains and swamps of the southern Sudan, inhabited by white-eared kob and Nile lechwe. Further north beyond the Blue Nile the country becomes progressively more arid, with a distinctive fauna including Soemmerring's and red-fronted gazelles, and the tara hartebeest which replaces the lewel.

Despite widespread and continuing habitat destruction, Ethiopia is not known to have lost any of the 29 species of antelope (with one species, hartebeest, represented by three subspecies) which occur within its borders. Assessment of the current status of antelopes (Table 1) is based largely on information collected by earlier workers in the period 1960-74 (little information has been published since), plus the writer's recent observations (1983-86) in the Bale and Arsii Mountains, Rift Valley, and Awash Valley. Sixteen species are not yet regarded as threatened in Ethiopia. The Ethiopian populations of seven of the eight species classified as rare or endangered in Table 1 represent peripheral populations of species which occur more widely in adjacent Sudan (white-eared kob, Nile lechwe, Mongalla gazelle), Somalia (Speke's gazelle, beira), or over a larger part of Africa (eland, mountain reedbuck); the sole exception is the endemic mountain nyala. Species confined to the western and southwestern lowlands (roan, topi, tara hartebeest) may not yet be endangered but are threatened by habitat destruction and rapidly increasing settlement by cultivators and pastoralists. The survival of tara hartebeest (and probably red-fronted gazelle) is also threatened by severe drought. Swayne's hartebeest is threatened by habitat destruction and poaching, but the third subspecies of hartebeest in Ethiopia, the lewel, is relatively widespread in small herds in the southwest of the country (Bolton 1973a) and the species as a whole is probably not in danger in Ethiopia.

**Conservation Measures Taken**

Ethiopia's development of a national system of protected areas for wildlife conservation has established a framework of ten gazetted or proposed national parks, 14 wildlife sanctuaries and reserves, and 17 controlled hunting areas (Fig. 2). Hunting is illegal in national parks and wildlife reserves, but licensed hunting is permitted within the controlled hunting areas. Licensed hunting indicates the presumed abundance of a species; general license—relatively abundant; special license—less abundant; specially protected—very rare. These categories require periodic review. Although considered to be conservation areas, controlled hunting areas have no permanent staff and little conservation is applied within them, except that scouts have to accompany legal hunting parties.

The national parks and wildlife reserves, including those which have been legally gazetted such as Awash and Simien National Parks, are often subjected to severe pressures such as occupation by local pastoralists with thousands of head of cattle and goats, cutting and burning of trees, cultivation, and poaching. The difficulties of establishing conservation areas are often increased by the presence of an armed local populace with a long tradition of hunting. Despite these overwhelming problems and severe financial constraints, the Ethiopian Wildlife Conservation Organisation (EWCO) has made impressive progress in some areas. Notable examples include the effective protection currently provided for Swayne's hartebeest in the Senekel Sanctuary and mountain nyala in the northern part of Bale Mountains National Park.

The latter area provides an excellent example of Ethiopia's conservation progress. Bale Mountains National Park conserves a large area (2000 sq km) of Afroalpine habitat and mountain scenery, together with the complete altitude and habitat gradient from wooded savanna grasslands to the subalpine zone. The park's three major habitats include: the northern woodlands and grasslands at altitudes of 3000-3400 m, which comprise about 10% of the park's total area and are the main habitat for mountain nyala, bohor reedbuck, grey duiker, and bushbuck; the central moorlands and alpine area, which comprises about 40% of the total area and extends from the treeline (3400 m) to several mountain peaks of over 4000 m; and the dense, tropical, moist Harenna forest which covers the southern half of the park, ranging in altitude from 1500 to 3400 m and including dry wooded grasslands, dense *Podocarpus* forest, mixed bamboo forest, and heather-covered slopes on the escarpment at the foot of the central mountain massif. These habitats are a centre of endemism that represents an important gene reservoir, and the mountains conserve a major water catchment area important to both Ethiopia and Somalia.

Bale Mountains National Park has a vital role to play in the sustained-yield management of natural resources in surrounding areas. Management plans for the park have been completed, accepted by an international workshop and EWCO, and are now being implemented (Hillman 1985, 1986). This progress has been achieved with minimal international financial assistance for park development.

**Conservation Measures Proposed**

The most immediate requirement for improving the conservation of Ethiopia's wildlife is international aid to enhance the status of EWCO within the Ministry of Agriculture. Provision of an internationally supported expert adviser, for example, would represent an important step towards developing the existing framework of conservation areas into a more effective system of national parks and wildlife reserves together with increasing communication with international conservation agencies. The cooperation of the people living in the vicinity of national parks and reserves is essential (Lewis & Wilson 1977). Ethiopia is a developing country faced with other extremely significant and urgent problems, such as severe drought and overgrazing, but effective solutions are closely related to the conservation of the environment, on which man's survival is dependent.

**Species Accounts**

The following accounts are based largely on information collected between 1960 and 1974, including Yalden et al. (1984), the other references cited, and the author's recent observations.

in the area between Addis Ababa and the Bale Mountains National Park.

Comments under "Habitat, Food & Reproduction" include what is known about each species' habitat, food preferences, average group size, dispersion pattern, seasonal movements, and reproduction in Ethiopia. The lack of information indicated for most species reflects the lack of data on these aspects.

**Bushbuck (Tragelaphus scriptus)**

**Distribution:** Formerly throughout most of the country, excluding arid areas. Present distribution similar to former, but more localised (Fig. 3).

**Population:** Unknown, but probably decreasing.

**Habitat, Food & Reproduction:** Occurs in bush, woodland, and forest (including riverine) with water. A browser of herbs and bush. Average group size 1–5 (Bale). Calves in the dry season (Bale).

**Status:** Satisfactory.

**Conservation Measures Taken:** Two males may be taken on a special license. Occurs in most conservation areas, except the very arid.

**Additional Remarks:** The bushbuck survives as a nocturnal species, even in areas with a dense human population, provided there is suitable cover to hide in by day. Considerable environmental variation has resulted in several subspecies. The most significant Ethiopian subspecies is Menelik's (T. s. menelikii) from high montane areas, the status of which is currently satisfactory.

**Mountain Nyala (Tragelaphus buxtoni)**

**Distribution:** Formerly occurred in the highlands east of the Rift Valley, between Gara Muleia and Bale, and possibly on peaks in Sidamo. Now more localised, occurring in isolated populations between the Chercher (Harar) and Bale Mountains (Fig. 3).

**Population:** Estimated population 2000–4000; decreasing.

**Habitat, Food & Reproduction:** Occurs in high altitude bush, woodland, and associated grassland, heather and Alloplpine moorlands at 3000–4200 m. A tiny population occurs at 1800 m at Wondo Genet. A browser of herbs, bush and lower tree branches, especially Alchemilla spp., Artemisia afra, Hypericum revolutum, and Hagenia abyssinica.

Average group size 8.6; range 1–96. Occurs in family groups, female plus last two progeny; aggregates into larger groups. Males occur in bachelor and/or family groups, up to 13 together. Not territorial, exhibits a dominance hierarchy.

Shows some local seasonal movement, using thicker habitat such as woodlands and heather more in the dry season. Avoids frosts and midday heat in the dry season by resting in woodlands. Undertakes nocturnal dispersal to avoid human disturbance by day.

Produces a single calf, 70% born in the late wet season.

**Status:** A rare species in view of the small total world population in Ethiopia; overall status reasonably satisfactory.

Fig. 3. Approximate limits of recorded distribution of antelopes in Ethiopia, broken lines represent former distribution, where indicated. Based on locality maps of records for each species in Volden et al. (1984). For each species, the shaded area represents the overall range (very approximately), not the area of continuous distribution. For Cleolae hartebeest the unshaded areas represent the occurrence of intergrades with tura hartebeest (western lowlands) and Swaine's hartebeest (southern lowlands).
Conservation Measures Taken: One male may be taken on a special license (limit six/year). Occurs in Bale Mountains National Park (population about 1250–1400), which extends from altitudes of 1500 m in the south, to the high plateau in the main mountain massif at over 4000 m with several peaks, the highest at 4400 m. A high density, expanding population occurs in a very restricted area near the Park Headquarters in the extreme north of the park at an altitude of 3000–3200 m. It is in this area that most conservation management has occurred over the last 15 years since the national park’s inception. Mountain nyala numbers have increased markedly during this period as a result of protection and the exclusion of domestic livestock. No other part of the Bale Mountains National Park carries high numbers of mountain nyala. Densities are very low and stable or declining over the more extensive, higher altitude, central section of the park. The Harena forest in the southern section of the park is a totally unsuitable habitat for the species. Outside the national park there is minimal protection in controlled hunting areas.

Conservation Measures Proposed: Proposals to extend the Bale Mountains National Park to include more optimum mountain nyala habitat at lower altitudes (3000 m) (Hillman 1985) are now being acted on; the optimum area for mountain nyala has been increased already by over 50% and is being made use of by the species. There is also a need for increased protection at higher altitudes within the park, aid to assist the development of conservation management in the park, and establishment of other conservation areas to the north in Arssi or Harergha.

Additional Remarks: This species has been studied in the field by Brown (1969) and Hillman (1985, 1986, in progress). The effect of conservation in the north of Bale Mountains National Park by EWCO has been phenomenal. However, less effective protection elsewhere in their range has resulted in a decrease.

Greater Kudu (Tragelaphus strepsiceros)

Distribution: Still occurs throughout most of its former distribution in the western foothills and lowlands, eastern and southern lowlands and Rift Valley (Fig. 3).

Population: Unknown, but probably stable.


Status: Satisfactory.

Conservation Measures Taken: One male may be taken on a special license. Occurs in most conservation areas, except high altitude and desert areas, and Gambella.

Lesser Kudu (Tragelaphus imberbis)

Distribution: Formerly occurred throughout the southern and eastern lowlands. Occupies much of its former distribution but localised and no longer occurs in the southern Rift Valley (Fig. 3).

Population: Unknown, but probably decreasing.


Status: Probably satisfactory.
**Conservation Measures Taken**: One male may be taken on special license. Occurs in Omo, Mago, and Awash National Parks, and Chew Bahar, Tama, Yavello, Alledeghi, and Harrar Wildlife Reserves.

**Common Eland (Tragelaphus oryx)**
*Distribution*: Occurs only in the Omo area (Fig. 3).
*Population*: About 1000; may be declining.
*Habitat, Food & Reproduction*: Occurs in bush and open grassland. A browser of herbs and bushes, and takes some grass in the early wet season. Very large groups (several hundred) observed in the Omo Valley (Urban & Brown 1968; Baha et al. 1982). Only present seasonally in the Omo, between October and March (early wet season), moving in from the Sudan.
*Status*: Rare in Ethiopia.
*Conservation Measures Taken*: One male may be taken on special license. Occurs in only one conservation area, the Omo National Park.

**"Red" Duiker (Cephalophus sp. indet.)**
*Distribution, Population & Status*: An expedition to the Hareena forest in the southern part of Bale Mountains National Park in 1986 produced positive sightings of a "red" duiker, which is the first record of a Cephalophus duiker from Ethiopia. Identification of the species will require the collection of specimens. It is highly likely to be the same species which occurs in Somalia (C. harveyi), probably having invaded the area up the Juba and Genale Valleys.

**Grey Duiker (Sylvicapra grimmia)**
*Distribution*: Formerly occurred throughout most of Ethiopia, except very arid areas. Present distribution similar, but localised (Fig. 3).
*Population*: Unknown but stable.
*Habitat, Food & Reproduction*: Found in all habitats with sufficient cover except desert and semi-desert. Average group size 1-2; male/female territory.
*Status*: Satisfactory; survives in areas with a dense human population if sufficient cover present.
*Conservation Measures Taken*: Two males may be killed per general hunting license. Occurs in most conservation areas, up to 3700 m.
*Additional Remarks*: This species has been studied in Ethiopia by Dunbar & Dunbar (1979).

**Waterbuck (Kobus ellipsiprymnus)**
*Distribution*: Former distribution not fully known. At present occurs in association with most major rivers, lakes and wetlands on both sides of the Rift Valley. Does not occur in arid areas or at very high altitudes (Fig. 3). Predominantly of the defassa sub-
species, with the *ellipsiprymnus* subgroup occurring in the southeast.

**Population:** Unknown but stable.

**Habitat, Food & Reproduction:** Prefers grasslands associated with permanent water. Occurs in small herds.

**Status:** Satisfactory.

**Conservation Measures Taken:** One male may be taken on special license. Occurs in most conservation areas except for very arid and high altitude areas and Harrar.

**White-eared Kob (Kobus kob leucotis)**

**Distribution:** Confined to the Gambella Salient in the extreme west on the Sudan border (Fig. 3).

**Population:** Unknown but decreasing. Numbers seasonally may be as high as several thousand in some years after migration from the Sudan, but it is not known whether there is a permanent population in Ethiopia.

**Habitat, Food & Reproduction:** Prefers open and wooded grassland; requires water. Occurs in large herds of several thousand and undertakes massive seasonal migrations between the Sudan and Ethiopia.

**Status:** Threatened by habitat destruction and new settlement.

**Conservation Measures Taken:** Two males may be taken on special license. Occurs in the proposed Gambella National Park.

**Nile Lechwe (Kobus megaceros)**

**Distribution:** Confined to the extreme western Gambella area (Fig. 3).

**Population:** A few hundred (Duckworth 1974); probably decreasing.

**Habitat, Food & Reproduction:** Occurs in swamps and wetlands; probably sedentary.

**Status:** Rare; threatened by new settlement.

**Conservation Measures Taken:** One immature male or female may be taken on a special license, with a limit of six animals per year. Occurs in the proposed Gambella National Park.

**Additional Remarks:** The very small Ethiopian population of this species is an extension of the Sudan animals.

**Bohor Reebuck (Redunca redunca)**

**Distribution:** Formerly occurred over much of the central and western parts of the country, except arid and very high altitude areas. Present distribution similar, but localised (Fig. 3).

**Population:** Numbers unknown, but decreasing.

**Habitat, Food & Reproduction:** Occurs in open grassland with water to quite high altitude (3750 m in Bale). Dispersion pattern: groups of 1-20; territorial males, bachelor groups, small family groups; dry season aggregations of more than 40. Undertakes local seasonal movements. Calves in the dry season (Bale).

**Status:** Satisfactory.

**Conservation Measures Taken:** Two males may be taken on special license. Occurs in Abiyatta-Shalla Lakes, Bale, Nechisar, and Gambella National Parks.

**Mountain Reebuck (Redunca fulvorufa)**

**Distribution:** Almost entirely restricted to the wetter parts of the Rift Valley and south-central area (Fig. 3).

**Population:** Occurs in small numbers; population stable.

**Habitat, Food & Reproduction:** Found in broken hill country and on rocky slopes. Occurs in small groups.

**Status:** Rare. Not threatened, since there is little human demand for its present habitat.

**Conservation Measures Taken:** One male may be taken on special license. Occurs in Abiyatta-Shalla Lakes, Awash, Nechisar, and Omo National Parks.

**Additional Remarks:** This species is not characteristic of mountains as elsewhere in its range, this niche seemingly being occupied by the bohor reebuck in Ethiopia.

**Roan (Hippotragus equinus)**

**Distribution:** Formerly widespread in the western lowlands, but now very localised (Fig. 3).

**Population:** Numbers unknown, but probably decreasing.

**Habitat, Food & Reproduction:** Prefers wooded grasslands. No data available on group size, dispersion, or reproduction.

**Status:** Threatened by habitat destruction and increasing settlement.

**Conservation Measures Taken:** One male may be taken on special license. Occurs in the proposed Gambella National Park.

**Beisa Oryx (Oryx gazella beisa)**

**Distribution:** Formerly occurred widely from Eritrea to the eastern and southern lowlands. Present distribution similar but localised (Fig. 3).

**Population:** Unknown, but probably decreasing.

**Habitat, Food & Reproduction:** Occurs in arid savanna and semi-desert.

**Status:** Probably satisfactory.

**Conservation Measures Taken:** Two adults may be killed on a special license. Occurs in Omo, Mago, Awash, and Yangudi Rassa National Parks, and Nakfa, Gewane, Yavello, Tama, and Chew Bahar Wildlife Reserves.

**Swayne’s Hartebeest (Alcelaphus buselaphus swaynei)**

**Distribution:** Formerly occurred throughout the Rift Valley eastward into Somalia. Now reduced to isolated populations in the Rift Valley (Fig. 3).

**Population:** Total population estimated at 2400–2700. The bulk of the population occurs in Senkelle, a heavily settled and cultivated plain, where the population increased from 400–500 in the early to mid 1970s (Bolton 1973a; Lewis & Wilson 1977) to about 1700 in 1984. The small population in Awash National Park is also increasing. A translocation of over 100 animals in 1974 from Senkelle to Awash and Nechisar, both of which lie within this hartebeest’s original range, resulted in the establishment of a small population in Awash, and a useful addition to those already in Nechisar. The population in Awash dispersed and disappeared, but the remaining 12 in 1976 had increased to at least 30 animals in 1985.

**Habitat, Food & Reproduction:** Occurs in open wooded grassland. A grazer. Group size ranges from 1 to 20; territorial males, bachelor groups, and female and juvenile herds. Seasonal movements are restricted. Attracted to freshly burnt areas and makes night incursions to farmland. Calving period April–May.

**Status:** Threatened by habitat destruction, and hunting for meat in the small southern populations at Yavello and Maze River. The increasing population at Senkelle is severely restricted by dense settlement. This subspecies only became endemic to Ethiopia through being hunted to extinction in neighbouring Somalia. Swayne’s (1895) records indicate how numerous this hartebeest once was, but by the 1950s it was in danger of extinction. It is but one example of how easily a widespread antelope population can be lost.

**Conservation Measures Taken:** Specially protected (no legal hunting). Four of the five remaining populations occur in conservation areas, viz., Senkelle Swayne’s Hartebeest Sanctuary (attached to Abiyatta-Shalla Lakes National Park), Nechisar and Awash National Parks, and Yavello Wildlife Reserve.

**Conservation Measures Proposed:** There is an urgent need to increase the available habitat of the Senkelle population. The Ethiopian Government has recently annexed 30 sq km from the neighbouring State Farm (maize) in aid of the hartebeest sanctuary.
The incentive was in part to improve the sanctuary, in part to remove unproductive land from the farm, and in part to protect the maize from night raids by the hartebeest. Finance is urgently required to fence the boundary with the State Farm, to prevent continued deprivations of trees and grass by people and their livestock within the sanctuary, prevent hartebeest damage to crops, and maintain respect for the sanctuary and its wildlife. There may also be a need to translocate animals from the rapidly increasing Senkelle population to suitable protected habitat elsewhere.

Additional Remarks: EWCO have done an incredible job of protecting this antelope, with virtually no aid, and desperately need international finance and expertise to ensure its survival. Field studies of Swayne’s hartebeest have been carried out by Hunting Technical Services (1976), Lewis & Wilson (1977, 1979), Lewis (1982), Messana (1983), and Kassaye & Messana (1984).

Tora Hartebeest (Alcelaphus buselaphus tura)

Distribution: Formerly throughout the northwestern lowlands. Now restricted to the central northwestern lowlands (Fig. 3).
Population: Numbers unknown, but decreasing.
Habitat, Food & Reproduction: Occurs in wooded grasslands.
Status: Threatened by habitat destruction.

Lelwel Hartebeest (Alcelaphus buselaphus lelwel)

Distribution: Southwestern lowlands along the Sudan border (Fig. 3).
Population: Numbers unknown, but decreasing.
Habitat, Food & Reproduction: Occurs in wooded grasslands.
Status: Threatened, at least in the medium-longer term, by habitat destruction and much new settlement.
Conservation Measures Taken: One male may be taken on a general hunting license. Occurs in Omo and Gambella National Parks. Neumann’s hartebeest, an intergrade between lelewel and Swayne’s, occurs in Mago National Park (Bolton 1973a).
Conservation Measures Proposed: Establishment of an effective conservation area in the Gambella region may be necessary to ensure the long-term survival of this hartebeest in Ethiopia (Bolton 1973a).

Topi (DamaLuxus lunatus tiang)

Distribution: The tiang, which is the local race of the topi, is restricted to the southwestern lowlands and the western border with Sudan (Fig. 3).
Population: Unknown but decreasing.
Habitat, Food & Reproduction: Occurs in lowland savanna, below 800 m. Probably undertakes seasonal movements to Sudan and Kenya.
Status: Threatened by habitat destruction and increasing settlement.
Conservation Measures Taken: Two males may be taken on a general hunting license. Occurs in Omo, Gambella and Mago National Parks, and Tama and Chew Bahar Wildlife Reserves.

Klipsspringer (Oreotragus oreotragus)

Distribution: Mainly in the Rift Valley and highlands (Fig. 3).
Population: Numbers unknown but stable.
Habitat, Food & Reproduction: Prefers steep, rocky cliffs. Average group size 1–5; territorial.
Status: Satisfactory.
Conservation Measures Taken: Two males may be taken on a general license. Occurs in most conservation areas, except Nechisar and Gambella National Parks.

Additional Remarks: Since this species’ habitat is not in demand by man, small populations survive wherever such habitat occurs. Ethiopia is probably one of the best countries for this species owing to the rugged nature of much of the country. Klipspringer has been studied in Ethiopia by Dunbar (1978, 1979) and Nie- vergelt (1981).

Beira (Dorcatragus megalotis)

Distribution: Marmar Mountains in the Somali/Djibouti border area (Fig. 3).
Population: Unknown but certainly very small.
Status: Unknown, but probably endangered in Ethiopia in view of the small population and lack of protection.
Conservation Measures Taken: Specially protected (no legal hunting). Does not occur in any conservation areas.
Conservation Measures Proposed: An investigation is needed to assess the status of this species and the possible protection of its habitat.

Additional Remarks: This species has been observed only twice in Ethiopia, in 1899 and 1970 (Bolton 1972, 1976).

Salt’s Dikdik (Madoqua saltiana)

Distribution: Arid areas in the northern and eastern lowlands (Fig. 3).
Population: Unknown, but stable.
Habitat, Food & Reproduction: Occurs in arid thornbush and semi-desert. Average group size 1–2; territorial.
Status: Satisfactory.
Conservation Measures Taken: Four males may be taken on a general hunting license. Occurs in Awash and Yangudi Rassa National Parks, and Harrar, Alledeghi, Gewane, Mille-Sardo, Yob, Chire, Nakfa, and Gash-setit Wildlife Reserves.
Conservation Measures Proposed: Ethiopian dikdiks have been studied by Yal- den (1978).

Guenther’s Dikdik (Madoqua guentheri)

Distribution: Southern and eastern lowlands (Fig. 3).
Population: Unknown, but stable.
Habitat, Food & Reproduction: Occurs in arid thornbush. Average group size 1–2; territorial.
Status: Satisfactory.
Conservation Measures Taken: Four males may be taken on a general hunting license. Occurs in Omo, Mago, and Nechisar National Parks, and Tama, Chew Bahar, Harrar and Yavello Wildlife Reserves.

Oribi (Ourebia ourebi)

Distribution: Mainly west of and in the Rift Valley (Fig. 3).
Population: Unknown, but stable.
Habitat, Food & Reproduction: Prefers open habitat, avoids forest, requires water. Can survive in cultivated areas. Average group size 2+; territorial.
Status: Satisfactory.
Conservation Measures Taken: Two males may be taken on a general hunting license. Occurs in most conservation areas, except the Bale, Awash, Yangudi Rassa, and Harrar areas.

Gerenuk (Litocranius walleri)

Distribution: Eastern and southern lowlands (Fig. 3).
Population: Numbers unknown, but probably decreasing.
Status: Probably satisfactory.
Conservation Measures Taken: Two males may be taken on spe-
Soolmvers Gazelle (Gazella sommerringii)

**Distribution:** Occurs in southern Rift Valley and Sidamo, Omo and Mago regions; formerly occurred north of Lake ZwaI (Fig. 3).

**Population:** Numbers unknown, but probably decreasing.

**Habitat:** Prefers semi-arid grasslands and Acacia savanna.

**Status:** Satisfactory.

**Conservation Measures Taken:** One male may be taken on a special license. Occurs in arid and semi-arid desert. 

**Additional Remarks:** Studies of the Ethiopian population of this gazelle, which is the northern race of Thomson’s gazelle, are required for its conservation.

Speke’s Gazelle (Gazella spekii)

**Distribution:** Unknown. Only reported with certainty once from Ethiopia, in the northern Ogaden (Fig. 3).

**Population:** Unknown.

**Habitat:** Recorded from arid thornbush.

**Status:** Probably endangered in Ethiopia.

**Conservation Measures Taken:** Not currently in any conservation area.

**Conservation Measures Proposed:** An investigation is required into the occurrence, distribution and status of this species in Ethiopia.

Mongalla Gazelle (Gazella thomsonii albonotata)

**Distribution:** Restricted to the Omo and Mago regions in the southwestern lowlands (Fig. 3).

**Population:** Occurs in small numbers; population probably stable.

**Habitat:** Occurs in open grassland.

**Status:** Probable satisfactorily.

**Conservation Measures Taken:** One male may be taken on a special license. Occurs in Omo National Park, but no other conservation areas.

**Additional Remarks:** The Ethiopian population of this gazelle, which is the northern race of Thomson’s gazelle, is a small relic population, the main population occurring in the southern Sudan.

References


Messana, G.G. 1983. A study of parental investment in the female...
Chapter 5: Djibouti

Introduction

The Antelope Specialist Group has been unable to establish a source of detailed information on the current status of antelopes in Djibouti. This brief report summarises the information on this country's antelopes available to the Antelope Survey.

Djibouti (formerly French Somaliland) is a small coastal enclaves (area: 21,800 sq km) situated adjacent to the outlet of the Red Sea at the head of the Gulf of Aden, and surrounded by Ethiopia and Somalia (Fig. 1). It lies within the Afar depression, a wide section of the Rift Valley which extends from the Red Sea southwards through Ethiopia, but the terrain is predominantly hilly and mountainous. Most of the country is above 500 m in altitude, with a narrow coastal lowland. There are several interior basins without outlet to the sea; some of these basins are well below sea level. The climate is semi-arid to arid, with irregular rainfall (<200 mm per annum, except at high altitudes).

There are no permanent watercourses in Djibouti, only wadis with intermittent flow. Subterranean water feeds springs and maintains relatively dense vegetation in the wadi beds. Lake Abbe in the southwest on the Ethiopia border is fed chiefly by the Awash River within Ethiopia. Some lakes are temporary and brackish or salt-encrusted mudflats, e.g., Lake Allol. Lake Assal is 153 m below sea level, with more than half of its surface a sheet of salt. There are extensive areas of sand flats, such as the Grand Bara in the south.

The natural vegetation is predominantly sparse semi-desert and desert scrub and grasses. To the north of the Gulf of Tadjoura are several mountainous areas, including the Goda and Mabla massifs which support the country's remaining highland forests. The Goda massif includes the Foret du Day, a relic juniper (Juniperus procerae)/box (Buxus hildebrandii) forest.

Djibouti has suffered severe degradation of natural habitats, similar to that of adjacent northern Somalia. This has been caused by long-term overgrazing and excessive destruction of trees for firewood and charcoal, aggravated by severe droughts. The remaining forests of the Goda massif, for example, are severely threatened by overexploitation. The forest cover of the Mabla massif has been greatly reduced and now consists largely of *Acacia* spp. and bushes. Elimination of woodland is creating serious erosion problems on hill slopes.

Current Status of Antelopes

Djibouti's antelope fauna includes species characteristic of the northern part of the arid Horn of Africa, such as Sait's dikdik, gerenuk, Soemmerring's and Pelzeln's gazelles. Up to 11 species may occur or have formerly occurred in Djibouti (see species accounts below), but there is insufficient information available to assess their current status with certainty.

H. Welch (in litt. July 1986) reported that while the sparse vegetation and barren habitat do not support large antelope populations, some species, e.g., Pelzeln's gazelle, are not uncommon. Hunting is banned in Djibouti and poaching does not appear to be a major problem. There is likely to be some killing of antelopes for food, but Djiboutiens have no tradition of eating meat. The major threats to antelopes are competition for food with domestic livestock, and habitat destruction resulting from man's activities combined with drought.

Conservation Measures Taken

The hunting ban which was introduced in 1971 is the main conservation measure taken in Djibouti affecting antelopes. The country's only conservation area is Day National Park (30 sq km), which includes part of Foret du Day. This national park is threatened by forest destruction, caused by tree-felling, overgrazing by livestock, and military exercises. Day National Park is not of major importance for antelope conservation, except perhaps for klipspringer.

Conservation Measures Proposed

There is an urgent need to establish effective environmental conservation programmes in Djibouti, including re-afforestation to develop new sources of firewood and timber, implementation of effective management and protection of Day National Park, extension of this national park to include as much as possible of the remaining relic Goda massif forest (about 420 sq km), and education programmes to develop public awareness of the need for conservation (MacKinnon & MacKinnon 1986).

Major requirements for antelope conservation include prevention of further degradation of natural habitats and maintenance of the ban on hunting. The sparse distribution of wildlife may make establishment of conservation areas for antelopes difficult in Djibouti's arid and semi-arid rangelands. In terms of international antelope conservation, Djibouti's main importance may be as one of two countries which support viable populations of Pelzeln's gazelle, which is listed as threatened in the IUCN Mammal Red Data Book.

Species Accounts

The following accounts briefly discuss species known or suspected to occur, or have occurred, in Djibouti (D.W. Yalden, in litt. October 1986). Occurrence in contiguous areas of adjacent countries is based on Yalden et al. (1984) for Ethiopia and Simonetta's account of Somalia (chapter 6 of this volume). The possible status of each species is assessed tentatively.

For five species, sightings recorded by G. and H. Welch in March 1984 and October–November 1985 are plotted as distributions by ¼° squares in Fig. 2. While these distributions are
based on casual observations of antelopes made during extensive ornithological surveys, they provide a useful indication of the present occurrence of these species.

**Greater Kudu (Tragelaphus strepsiceros) and Lesser Kudu (Tragelaphus imberbis)**

*Distribution & Status:* These two species formerly occurred widely in semi-arid scrub in hilly country (greater kudu) and flatter terrain (lesser kudu) in adjacent parts of Ethiopia and Somalia, where their populations have now been severely reduced or eliminated by overhunting and habitat degradation. If either or both species persist in Djibouti, their status is probably rare, vulnerable or endangered.

**Waterbuck (Kobus ellipsiprymnus)**

*Distribution & Status:* Waterbuck of the defassa subspecies have been recorded in the Awash River Valley in Ethiopia, and could possibly extend, or have extended, along this valley to the Lake Abbe area in southwestern Djibouti. If this species does occur in Djibouti its population is unlikely to be large. Lake Abbe is not threatened at present by any development schemes (MacKinnon & MacKinnon 1986).

**Belsa Oryx (Oryx gazella belsa)**

*Distribution & Status:* Formerly occurred in Ethiopia and Somalia in areas adjacent to Djibouti's western and southeastern borders, respectively, and was probably widespread in suitable habitat within Djibouti. This species has been overhunted to the point of extinction over large areas of its range in the Horn of Africa, e.g., it has been eliminated from northwestern Somalia. It is a large, conspicuous antelope of open country and occurs in sub- stantial herds. Failure to observe it in any of the 1/4° squares visited by G. and H. Welch (Fig. 1) suggests that if it still occurs in Djibouti, its numbers may be greatly reduced and it is probably vulnerable or endangered.

**Swayne's Hartebeest (Alcelaphus buselaphus swaynei)**

*Distribution & Status:* This hartebeest was formerly common in northwestern Somalia and adjacent parts of Ethiopia, but it was exterminated in this area before 1930 and now survives only in Ethiopia’s Rift Valley. It is possible that its former range extended into southeastern Djibouti.

**Klipspringer (Oreotragus oreotragus)**

*Distribution & Status:* Occurs locally in montane areas (Fig. 2); observed only in the Goda and Mabla massifs within the 1/6° squares in which it was recorded. This species’ adaptation to steep, rocky hillside and cliffs inaccessible to man and his livestock enable it to survive despite the degradation of surrounding savanna and woodland habitats, especially if hunting pressure is not severe. Its status is regarded as satisfactory in both Ethiopia and northern Somalia. It probably occurs in small, localised populations in Djibouti, where its status may be rare.

**Salt’s Dikdik (Madoqua saltiana)**

*Distribution & Status:* This species occurs widely in arid thornbush in northeastern Africa. It is probably widespread within suitable habitat in Djibouti (Fig. 2). It may have benefited from bush encroachment following overgrazing by domestic livestock, and its status is probably satisfactory.
Reira (Dorcatus tragulus)

Distribution & Status: Still occurs widely in the mountains and arid stony hillsides of northern Somalia, including the Marmar Mountains on the Ethiopia/Somalia border adjacent to southeastern Djibouti. If it is present within Djibouti, its population is probably small and localised.

Gerenuk (Litocranius walleri)

Distribution & Status: Occurs sparsely in arid thornbush in adjacent parts of Ethiopia and Somalia, and was observed in two 1/4° squares in southern Djibouti (Fig. 2). This area is the northern limit of the species' continental distribution, and its status in Djibouti is probably rare.

Soemmerring's Gazelle (Gazella soemmerringil)

Distribution & Status: Formerly very widespread in northeastern Africa, in semi-arid and arid grasslands and open bushland, but has been eliminated from large parts of its range, e.g., from most of northern Somalia. It still occurs in extreme northwestern Somalia, adjacent to the border with Djibouti. It persists locally in Djibouti, but failure to observe it in more than four of the 1/4° squares visited (Fig. 2) suggests that it is not widespread, especially as it is a conspicuous species of open country. Its status in Djibouti may be indeterminate (i.e., rare, vulnerable or endangered).

Pelzeln's Gazelle (Gazella dorcas pelzelnii)

Distribution & Status: This distinctive race of the dorcas gazelle is confined to the northern coastal strip of the Horn of Africa. It is still seen regularly in suitable areas of Djibouti, including 13 out of 21 1/4° squares (Fig. 2), and is probably the country's most common antelope (H. Welch, in litt. July 1986). Its adaptation to very dry conditions may allow it to survive habitat degradation and the region's general increase in aridity better than other species, and its survival may not be threatened at present.

Note Added in Proof: A manuscript describing the preliminary results of a survey of the distribution and ecology of antelopes in Djibouti ("Notes concernant la repartition et l'ecologie des gazelles en Republique de Djibouti," by Jacques Blot, Institut Superieur d'Etudes et de Recherches Scientifiques et Techniques, B.P. 486, Djibouti) was obtained by ASG member Jesse C. Hillman through the Djibouti embassy in Addis Ababa in June 1987. Blot concluded that hunting (prior to the ban in the early 1970s) had reduced greater kudu and beisa oryx to relic populations within Djibouti, but populations of most other antelopes are slowly increasing, although this increase is limited by competition with herds of domestic livestock. Blot's report included notes on eight species: greater kudu (largely wiped out by hunting, and competition for food and water with domestic livestock; seen rarely near the Ethiopian border), beisa oryx (now restricted to the Gamma plateau on the Ethiopian border in the west, where the animals which occur within Djibouti are probably part of a larger population in adjacent Ethiopia; occasional wanderers from Somalia may occur on the Ali Sabich massif in the southeast), klipspringer (limited to the Goda and Mabla massifs, occurring at altitudes above 600 m; this species appears to have been affected least by hunting and does not suffer competition from domestic herds except during droughts; population of 250 in the Forêt du Day), Salt's dik dik (occurs widely; overall status satisfactory), gerenuk (very rare; total population does not exceed 200 individuals), Soemmerring's gazelle (substantially reduced by hunting in earlier years; the recovery of its population is limited by competition with sheep and goats), Pelzeln's gazelle (the most abundant antelope species in Djibouti; its population has increased slowly since 1980, but competition with goats is a limiting factor), and grey duiker Sylvicapra grimmia (one observation in the Forêt du Day, the only area of suitable habitat for this duiker, which suggests that there may be a relic population there).

References


Chapter 6: Somalia

A.M. Simonetta

Introduction

Situated in the arid Horn of Africa, Somalia is a land of semi-arid coastal steppes and inland plains and plateaux, with a narrow strip of dry rugged mountains and hills in the north separated from the Gulf of Aden by the arid northern coastal strip (Fig. 1). Somalia has suffered more severely than any other sub-Saharan African country from habitat degradation through human misuse (1lemming 1966). Long-term habitat destruction and desertification of fragile arid and semi-arid ecosystems caused by overgrazing and increasingly frequent droughts has been accompanied by uncontrolled slaughter of wildlife. This commenced in the early 1900s in the former British protectorate and after World War II in the former Italian territories (Funani & Simonetta 1966). Southern Somalia has suffered less from habitat overutilisation by the livestock of nomadic pastoralists than the northern parts of the country, but agricultural development and southward extension of the cattle industry are now placing severe pressures on many of the remaining wildlife habitats.

As a developing nation faced with worsening effects of drought, deforestation and overgrazing, and a possible long-term climatic change towards increasing aridity, Somalia cannot afford to lose completely its wildlife, which includes many species uniquely adapted to arid and semi-arid habitats (Simonetta & Simonetta 1983). Somalia's antelopes and other large mammals have major potential to be exploited for the production of meat and hides, and for tourism. The very serious decline of almost all species of wildlife over the last 50 years represents a tragic loss of valuable natural resources which could be of major importance to the country's future development. The government recognises the need to develop an effective system of wildlife conservation and management, under the auspices of its National Range Agency.

This account of Somalia's antelopes is based on extensive field observations made between 1979 and 1983 when the author was professor of zoology at the Faculty of Agriculture of the Somali National University and while on special assignments to the National Range Agency.
continues to deteriorate. Over half of the country's 23 antelope species are now classified as endangered, rare, or vulnerable, or are in one of these three categories (indeterminate) (Table 1). The assessments in Table 1 are probably optimistic.

There are two principal causes of this situation: firstly, habitat deterioration caused by overgrazing, deforestation, and badly planned agricultural developments; secondly, uncontrolled hunting. The latter includes both organised poaching by armed gangs, and subsistence hunting which has intensified over the last decade as recurrent droughts have forced local populations to hunt increasingly for food.

In the northern regions of Somalia, which have suffered longest from habitat degradation and severe overhunting, all species of antelopes are now greatly depleted or locally extinct, e.g., greater and lesser kudu, Soemmerring's gazelle and Swayne's hartebeest. In the interior of the northeastern region game species suffered severely during the great drought of 1973 and have been unable to recover, but the situation is apparently better in the sparsely populated coastal area north of Bender Beila, where remnant populations of Speke's gazelle, beisa oryx, and gerenuk still occur. The mountainous regions of northern Somalia are less attractive to nomadic pastoralists than the plateaux and have suffered slightly less habitat degradation. Beira and kipspringer still occur throughout most of their original ranges in this mountainous strip. The antelope populations of the Haud have been reduced greatly but some species survive, such as lesser kudu, gerenuk, Guenther's and Salt's dikdiks, and Speke's gazelle. In central Somalia large wild animals have been very rare for the last 15 years along the disputed border area from Belet Weyn to Galkayo; the faunal situation was satisfactory along the coast and for up to 100 km inland until 1980, but is now deteriorating rapidly. Antelopes which still occur in this central coastal zone and its hinterland include lesser kudu, dibatag, Salt's dikdik, Guenther's dikdik (inland), Piacentini's dikdik (coastal), oryx, gerenuk, and Speke's and Soemmerring's gazelles.

Between the Shebelle and Juba Rivers, lesser kudu, Guenther's, Kirk's and Salt's dikdiks, and gerenuk are still widespread and remnant populations of oryx and Soemmerring's gazelle occur. A depleted but viable antelope fauna may survive, at least locally, in the hilly bush-covered northern region of this zone, towards the border with Ethiopia, but the densely settled agricultural areas in the Baidoa region have been lost for wildlife. The southern corner of this zone has pockets of abundant wildlife but poaching is severe. Most of the natural riverine habitats along Somalia's two main rivers, the Shebelle and Juba, have been destroyed by farming projects, but some line zones remain along the lower Shebelle and in patches on the Juba. The antelopes characteristic

Current Status of Antelopes

Arid and semi-arid conditions have persisted in the Somali region throughout the long-term climatic fluctuations that have affected most of the African continent. Consequently, this region has been an evolutionary centre of fauna and flora adapted to arid and sub-desert conditions. Somalia's antelopes include unique species which are confined to the Somali region, e.g., dibatag, beira, and Speke's gazelle, plus others which have spread to neighbouring regions, e.g., gerenuk.

The current status of Somalia's antelopes is alarming and it

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**Table 1**

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*Ex = extinct; En = endangered; R = rare; V = vulnerable; I = indeterminate (i.e., endangered, rare, or vulnerable); K = insufficiently known; S = satisfactory (not threatened) See chapter 1 for definition of status categories.

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of these well-watered riverine habitats, which include bushbuck, waterbuck, topi, oribi, and Harvey’s red duiker, have already lost three-quarters of their habitat to agriculture. The former three species still occur locally in good numbers, but all are threatened seriously by poaching.

The lower Juba area from the Juba River to the Kenyan border was formerly one of Somalia’s richest wildlife areas. It lies within a transitional zone between typical Somali and typical Kenyan fauna extending from the Juba to the Tana River in Kenya. The hirola occurs only in this zone. The antelope fauna also includes lesser kudu, oryx, Guenther’s and Kirk’s dikdiks, gerenuk and Grant’s gazelle (replacing Soemmerring’s gazelle), with bushbuck, waterbuck, topi and oribi occurring in the relatively densely wooded savanna of the Lake Badana region at the southern tip of the country. Poaching has severely reduced the wildlife of the lower Juba area. Oryx and hirola have suffered seriously, the other antelopes less so.

Conservation Measures Taken

Wildlife conservation is at an embryonic stage in Somalia. The game regulations of past colonial administrations allowed native hunters to take the commoner kinds of game without any licence. Hunting was prohibited in Somalia in 1971, but the relevant law provided only for prohibiting the issue of game licences and was generally considered to be not applicable to local hunters who hunt without a licence. The only organized anti-poaching force is a special police division (Askar Marooodi) of about 150 men. This division is devoted to its task and achieves some good results, but a larger, better trained and equipped force is necessary.

The faunally rich Lake Badana region has long been recognised as a potential national park. The legal boundaries for a national park in this region were established by the Italian administration more than 30 years ago, but it continues to suffer seriously from poaching.

Conservation Measures Proposed

The Somali government recognizes the need for a new and comprehensive legislation covering all aspects of wildlife management. Accordingly, a new legislation has been drafted to allow for the easy establishment of national parks and various classes of reserves to protect Somalia’s remaining wildlife, while reducing inconveniences for the local populations to the unavoidable minimum. The draft legislation also incorporates a scheme for effective control of hunting and the prohibition of uncontrolled or “free” hunting.

Effective development of wildlife management in Somalia will depend equally on the training of sufficient personnel to put the proposed legislation into force. Recommendations have been made for the introduction of wildlife management courses in the Somali National University, supported by the Italian Cooperation Programme, to train sufficient Somali professionals to staff the wildlife service of the National Range Agency. There is also an urgent need to improve the efficiency of the anti-poaching units by improving the Askar Marooodi to a complement of at least 300, fully trained in weaponry and anti-guerrilla fighting techniques, with an additional force of at least 400 non-military scouts, who may be sufficient in areas where elephant poachers are not active.

Areas where national parks and wildlife reserves of importance to antelopes are proposed are indicated in Fig. 1. Areas in northern Somalia include: Zeila in the northwest, where the partial reserve established by the British has never been properly enforced but Soemmerring’s and Pelzeln’s gazelles still occur; the Waggar Mountains-Gaan Libah, which contains what may be the country’s only surviving population of greater kudu, plus beira and klipspringer; Daloa Forest, where a remnant Juniperus forest survives in reasonably good condition and antelopes protected would include beira, klipspringer, Salt’s and Guenther’s dikdiks, and Pelzeln’s gazelle, if the proposed national park was extended eastward and northward to the coast; the Las Anod-Taleh-Fl Chemel region, which would protect oryx, Salt’s and Guenther’s dikdiks, beira, gerenuk, Specke’s and Soemmerring’s gazelles, and other species including wild ass (Equus asinus somalicus) and cheetah (Acinonyx jubatus); and Ras Hajun-Ras Guba in the northeast, where oryx, Salt’s dikdik, gerenuk, Soemmerring’s and Specke’s gazelles occur.

In the central coastal region a “game reserve” has been established by the National Range Agency in the hinterland of Hobyo as the area was exceptionally rich in oryx, dibatag, Soemmerring’s and Specke’s gazelles, with gerenuk, Piacentini’s and Salt’s dikdiks also present. However, this area is also heavily grazed by domestic stock during some seasons. A reserve may also be necessary in the Haradere-Awale Rugno area, which is reported to be a key area for dibatag and Soemmerring’s gazelle, and probably also supports oryx, Piacentini’s and Salt’s dikdiks, and Specke’s gazelle.

Hargan-Dandaloo is a very important area in inland Somalia between the Shebelle and Juba Rivers. Much of this area is of little significance for livestock grazing and has major potential as a site for the establishment of a national park, with adjacent wildlife reserves. The area’s wildlife includes lesser kudu, oryx, Guenther’s and Salt’s dikdiks, and gerenuk, as well as a few elephants, giraffes (Giraffa camelopardalis), and possibly Grey’s reedbuck (Equus grevyi).

Areas readily accessible from Mogadishu which are proposed as reserves include Jufar-Warshek, which extends from a strip of swamps and riverine habitats on the Shebelle River where bushbuck, waterbuck and gerenuk occur, through coastal plain and dunes inhabited by lesser kudu, gerenuk, Piacentini’s and Salt’s dikdiks, Soemmerring’s and Specke’s gazelles, to the sea; Har Yiblane, which surrounds a fairly large permanent swamp and is inhabited by lesser kudu, oryx, gerenuk and Soemmerring’s gazelle; Eji-Oobale, an important area of riverine forest on the Shebelle River with bushbuck, lesser kudu, waterbuck and gerenuk, Awadhige-Gandershe on the Shebelle, where bushbuck, waterbuck and oribi occur; and Arbowerow, where the fauna includes bushbuck, lesser kudu, grey duiker, waterbuck, oryx, topi, Guenther’s and Kirk’s dikdiks, oribi and gerenuk, as well as elephant (Loxodonta africana) and buffalo (Syncerus caffer).

There is an urgent need to establish reserves for the preservation of the remaining riverine habitats of the lower Shebelle and Juba Rivers, to protect the remnant populations of Harvey’s red duiker (Juba only), bushbuck, waterbuck, topi (Shebelle only) and oribi in those areas. Proposed reserves include the Boja Swamps Wildlife Reserve on the lower Shebelle, which is also vital for elephant and buffalo in that area, and the Anglo-Forbiddu National Park, which comprises the last almost intact riverine forest surviving along the Juba.

Reserves are also essential in the lower Juba area to act as cornerstones on which the formerly rich large mammal fauna of this region may be rebuilt. The boundaries of the proposed Lack Badana National Park need revision to enable more effective protection of elephant, black rhinoceros (Diceros bicornis) (the largest populations of these two species remaining in Somalia), and savanna antelopes, which include bushbuck, lesser kudu, grey and possibly Harvey’s red duikers, waterbuck, topi, oribi, Kirk’s dikdik, gerenuk and Grant’s gazelle. A national park and wildlife reserve have also been proposed at Lake Dere, which contains the only sizeable populations of hirola and Grant’s gazelle remaining in Somalia, and other antelopes including lesser kudu, oryx, gerenuk, and Guenther’s and Kirk’s dikdiks. Far Wamo is also a potentially valuable wildlife reserve; antelopes occurring.
there include lesser kudu, waterbuck, Guenther's and Kirk's dikdik, and gerenuk.

Further field work is required urgently to determine precisely the most appropriate areas for national parks and reserves (Simonetta & Simonetta 1983). Establishment of an effective system of conservation areas in Somalia in the near future is vital to prevent the catastrophic decline of the country's unique antelope fauna from culminating in the extinction of most species.

**Species Accounts**

**Bushbuck (Tragelaphus scriptus)**

*Distribution:* Formerly occurred widely in the riverine habitats of the Shebelle and Juba, and in the Lake Badana region. A substantial part of its former range has now been lost to agriculture (Fig. 2).

*Status & Population:* Vulnerable; except perhaps in swampy areas of the lower Shebelle it is certainly rare where it survives.

**Greater Kudu (Tragelaphus strepsiceros)**

*Distribution:* Former range included the northern mountains, eastern Haud, near Belet Weyn, and in the Mata Harba Hill on the Kenya border (Fig. 2). The only area where a few greater kudu may still be present is a strip about 5 km wide and 30 km long on the northern slopes of the Gaan Libah. In the Haud it occurred until about ten years ago, but it may have since been exterminated by the gangs of guerrillas (some in support of and some against the Somali government) who move across the border in this area. It may still occur just beyond the disputed border near Belet Weyn and move occasionally into Somalia. At Mata Harba, there were very few specimens in 1965 but there are no recent records. Trophics appear from time to time on the market, but it is impossible to be sure of their origin.

*Status & Population:* Endangered. In the former British Protectorate the greater kudu was exterminated over most of its range before 1940. Current numbers are unknown but certainly very few.

**Lesser Kudu (Tragelaphus imberbis)**

*Distribution:* Formerly widespread, except in northeastern Somalia. Its numbers and range have been reduced markedly in the former British Protectorate, although information is scanty. In central and southern Somalia the range is almost unchanged except around the main settlements, especially the Galkayu area (Fig. 2).
Status & Population: Numbers have certainly declined over most of its range, but estimates are impossible. It is still one of the most abundant Somali antelopes.

Harvey's Red Duiker (Cephalophus harveyi)
Distribution: Occurred in riverine habitats on the Juba River, possibly on the lower Shebelle, and in the Lake Badana region. This duiker may presently survive only in a few patches of riverine forest on a stretch of the Juba about 40 km south of Dujuma-Boale (Fig. 2). It may also survive in the Lake Badana region.
Status & Population: In imminent danger of extinction because of habitat destruction. It is impossible to make even a tentative estimate of numbers.

Grey Duiker (Sylvicapra grimmia)
Distribution: Still occupies most of its range along the Shebelle and Juba, and in the Lake Badana region (Fig. 2).
Status & Population: This species has always been rare in Somalia. Due to its secretive habits, the population is probably stable. Numbers are unknown.

Waterbuck (Kobus ellipsiprymnus ellipsiprymnus)
Distribution: Formerly widespread in riverine grasslands on the Shebelle and Juba Rivers, and in the Lake Badana region. Much of the former range has now been lost to agriculture (Fig. 2).
Status & Population: Threatened by habitat destruction. Waterbuck are also poached, though somewhat less than other antelopes as their meat is considered very poor. No assessment of present numbers is possible, but this species is still common in a few places on the lower Shebelle.

Beisa Oryx (Oryx gazella beisa)
Distribution: Formerly occurred very widely in Somalia. Now exterminated over most of its former range and reduced to scattered remnants (Fig. 2).
Status & Population: In imminent danger of extinction, with poaching the primary threat. Total population about 1000-1200, with at most 200 left in northern Somalia, perhaps 200-300 in central Somalia north of the Shebelle, about 400 between the Shebelle and the Juba, and as many along the Kenya border. The surviving animals are mostly isolated or scattered in small groups and are constantly sought after by poachers.

Swayne's Hartebeest (Alcelaphus buselaphus swaynei)
Distribution & Status. This hartebeest was formerly common in the northwest of the country (Fig. 2). It suffered severely from uncontrolled hunting once guns became freely available in the former British Protectorate at the beginning of this century, and was exterminated in Somalia before 1930 along with the British Protectorate's elephants and giraffes.

Topi (Damaliscus lunatus topi)
Distribution: This species has always been very local in Somalia as suitable areas of floodplain grassland were few. It was exterminated from the northern part of its range on the Shebelle before 1930 and from the Juba by 1950, due to agricultural transformation of its habitat. Further areas have been lost to cultivation more recently and the topi is now confined to very restricted pockets of its former range (Fig. 2).
Status & Population: Endangered by the combined effects of habitat loss and poaching, although it still occurs locally in good numbers on the lower Shebelle.

Hirola or Hunter's Hartebeest (Damaliscus hunneri)
Distribution: The hirola has vanished from much of the area where it occurred in the past, and is now confined to the core of its former range (Fig. 2).

Fig. 2. Distribution of antelopes in Somalia—continued.
**atrus & Population:** It has suffered considerably from poaching and numbers are undoubtedly much reduced and declining further. Numbers have apparently always fluctuated considerably, perhaps as a result of migration across the Kenya border. Very few wildlife have been seen when part of its range was visited in 1982, with there being a pronounced drought and they might have moved to better grazing elsewhere.

**Klipspinger (Oreotragus oreotragus)**

**Distribution:** This species still occupies most of its range in the mountains of northern Somalia (Fig. 2).

**Status & Population:** Probably satisfactory. Numbers are unknown, but it is apparently fairly common where present.

**Guenther’s Dikdik (Madoqua guentheri), Kirk’s Dikdik (M. kirkii), Placentini’s Dikdik (M. placentini), and Salt’s Dikdik (M. saltiana)**

**Distribution:** The Horn of Africa has been the centre of dikdik evolution and all four existing species (accepting the revision by Yalden (1978) for present purposes, although it may not be entirely satisfactory) occur in Somalia. Salti’s dikdik occurs throughout Somalia except for the lower Juba region. Placentini’s dikdik (which is confined to Somalia) occurs in the central coastal region. Guenther’s and Kirk’s dikdik occur widely, but are absent from the central coastal strip and the extreme northwest and northeast. Kirk’s dikdik is often considered to be confined to the southern coastal region, south of the Shebelle River, with Guenther’s extending further north. In practice, it is very difficult to separate Kirk’s and Guenther’s dikdiks in the flesh; usually the skulls can be distinguished, but intermediates exist. There has probably been little or no change in the range of the various species (Fig. 2).

**Status & Population:** Dikdiks inhabit thickets and overgrown scrub and have probably been favoured, at least in the short term, by the ecological changes resulting from overgrazing by domestic stock. They are not usually shot, but are taken locally with nets, and numbers have decreased in the more closely settled areas.

**Beira (Dorcotragus megalotis)**

**Distribution:** This species has a very patchy and localized distribution in the mountains and arid stony hills of northern Somalia (Fig. 2). It is apparently a very selective feeder and its distribution may be related to that of its food plants, but it is not known exactly what it eats. The species’ range is probably largely unchanged.

**Status & Population:** Information on numbers both in the past and at present is very meagre. Reliable reports suggest that there was a marked decrease, at least locally, during the 1975 drought and numbers have not recovered. The beira is protected from hunting to some extent by its conspicuousness, the colouring merging closely with the stony hillsides on which it occurs, but it may be affected by habitat deterioration as much of its range is overgrazed.

**Oribi (Ourebia ourebi)**

**Distribution:** Confined to riverine grassland on the Shebelle and Juba Rivers and the Lake Haddana region (Fig. 2). Considerable parts of its former range have been lost to agriculture. The oribi of southern Somalia and adjacent eastern coastal Kenya is an isolated subspecies (O. o. haggardii) which is well differentiated in size and colour from other oribis.

**Status & Population:** In addition to loss of habitat, oribi have been heavily poached with snares. They have never been common and their present status is obscure.

**Gerenuk (Litocranius walleri)**

**Distribution:** Formerly throughout Somalia except for the northwestern and northeastern coastal zones. The gerenuk’s range is largely unchanged, but it has been eliminated from some areas, e.g., around Galkayo and Mogadishu (Fig. 2).

**Status & Population:** Now rare over most of its present range. Still occurs in fair numbers only in some pockets on the lower Shebelle, and in the far Wamo-Lake Badana region. The gerenuk of northern Somalia, which is a highly distinctive form, is vulnerable if not endangered, but the species as a whole is probably not yet threatened in Somalia.

**Dibatag (Ammodorcas clarkei)**

**Distribution:** Formerly widespread in the Hadu and central Somalia, the dibatag has lost about half of its former Somali range, although mainly areas where it was not common (Fig. 2).

**Status & Population:** Has suffered severely from poaching, drought, and overgrazing by livestock. Even where it still occurs, numbers are much reduced, although local concentrations still occur in the coastal hinterland of central Somalia (Hobyo and Haradere-Awale Rugno). Not enough evidence is available to assess the significance of the reduction in the population or present numbers.

**Soommerring’s Gazelle (Gazella soommerringii)**

**Distribution:** Formerly very widespread north of the Juba River, except in central Somalia, but now eliminated from much of its former range (Fig. 2).

**Status & Population:** Formerly extremely abundant, the numbers of this gazelle have been greatly reduced, even where it survives, by poaching and habitat degradation. A few concentrations still exist, e.g., in a localised area of the central coastal hinterland and immediately south of the Haradere-Awale Rugno region, but the surviving animals are usually seen in pairs or small groups.

**Grant’s Gazelle (Gazella granti)**

**Distribution:** Confined to the lower Juba region (Fig. 2).

**Status & Population:** This gazelle has been subjected to considerable poaching, especially around villages and military camps. Numbers have been reduced to no more than one-quarter of their former level. The major surviving concentration is in the Lake Dere area.

**Pelzeln’s Gazelle (Gazella dorcas pelzelnii)**

**Distribution:** A distinctive race of the dorcas gazelle, Pelzeln’s gazelle occurs in the northern coastal strip of Somalia, where its range is practically unchanged (Fig. 2).

**Status & Population:** Although it has suffered from excessive hunting and serious overgrazing by domestic livestock, the overall situation of this gazelle may be better than for most other species. It is well adapted to arid conditions. Its populations are probably reduced, but information on numbers in both former and present times is extremely scanty. The largest surviving populations are in the eastern half of its range.

**Speer’s Gazelle (Gazella spekei)**

**Distribution:** This species is confined to the Somali region, where it was formerly widespread in the open, barren grasslands of northeastern Somalia and the central coastal region. It still occurs throughout most of its former range (Fig. 2).

**Status & Population:** Numbers have been much reduced almost throughout its range by poaching, drought and overgrazing of its habitat by domestic livestock. An exception is the Hobyo area, where the killing of this species is considered to bring good luck. Local concentrations still occur in a few other areas, such as the coastal hinterland north of Bender Beila, Los Anod-Taleh, and scattered areas of the central coastal zone between Johar Warsheek and Haradere-Awale Rugno. It remains one of the most abundant Somali gazelles.
Chapter 7: Uganda

Jonathan Kingdon

Introduction

Uganda lies in the Upper Nile basin, bounded on the west by the western branch of the Rift Valley extending south from Lake Mobutu (Albert). Annual rainfall is relatively high, varying from less than 800 mm in the northeast to more than 2000 mm in the southwest. Natural vegetation comprises moist wooded Combretum/Acacia savannas, with extensive swamps and lake systems, patches of evergreen forest especially in the southwest, and an area of semi-arid Acacia thornbush and dry savanna grasslands in the northeast (Fig. 1). The human population density is relatively high, especially in southern, central, and northeastern Uganda, and settlement and agricultural development have excluded most species of wildlife from large areas.

The conservation areas which were developed in Uganda during the 1950s and 1960s were regarded as among the best-managed in Africa, and played a major role in the rapid expansion of tourism during that period. The breakdown of law and order and major economic decline during the rule of Amin (1971–79), and the subsequent political instability and civil war had severe consequences for Uganda’s wildlife. It is to be hoped that the victory of the Museveni forces in January 1986 will produce a new era of political stability and enable the successful implementation of current attempts to revive Uganda’s commitment to conservation.

Current Status of Antelopes

Uganda has a diverse antelope fauna for a relatively small country, with about 30 species having been recorded or likely to occur (Table 1). Only a minority of these species are (or were) widespread. Hartebeest, kob, waterbuck, bohor reedbuck and oribi occurred widely in the moist wooded savannas and grasslands, with eland, roan and topi more locally distributed. Bushbuck and grey duiker occur widely in patches of scrub and thicket and forest edges within the savannas, with sitatunga in the swamps. Most other species have more restricted distributions, with several at the peripheries of their geographical ranges in Uganda. Greater and lesser kudu, Guenther’s dikdik, klipspringer, beisa oryx and Grant’s gazelle are largely or entirely confined to the semi-arid northeastern region, which provides similar habitats to northern Kenya and the southern Ethiopian lowlands. The Albert Nile in northwestern Uganda is the southeastern limit of the range of giant eland and red-flanked duiker in West and central Africa. Blue, Weyns’, black-fronted, yellow-backed and other forest duikers occur in the lowland and/or montane rainforests, especially in the southwest. Here some forest antelopes which are widespread in the forests of eastern Zaire reach their eastern limit, e.g., Bates’ pigmy antelope.

Among the antelopes which formerly occurred widely in Ugandan, only those species which are able to withstand heavy hunting pressure and can survive in densely settled areas have remained widespread, e.g., bushbuck and grey duiker. Medium-sized and large antelopes of open country, such as kob and hartebeest, are now largely confined to conservation areas. Many forest antelopes have also suffered a contraction of range and reduction in numbers because of widespread destruction of their habitats. Environmental degradation resulting from overgrazing by domestic livestock and accentuated by drought has probably had a detrimental effect on most of the wildlife of the semi-arid northeast. As a result of these factors and the limited former distributions of most antelopes, the majority of species are now threatened to some degree in Uganda (Table 1). The long-term survival of most of the country’s antelopes is therefore dependent on effective conservation measures.

Conservation Measures Taken

Uganda has four national parks (Fig. 2). Murchison Falls National Park comprises mainly savanna on both sides of the Victoria Nile; it also includes the Rabongo forest (about 220 sq km), and papyrus beds along the Nile. Queen Elizabeth National Park contains savanna and swamps along the shores of Lake Edward and the Kazinga Channel which links it with Lake George. A substantial part (about 200 sq km) of the Maramagambo Forest lies within the southeastern sector of Queen Elizabeth National Park. Kidepo Valley National Park in the far northeast is mainly dry savanna. The recently gazetted Lake Mburu National Park (formerly a game reserve) in southwestern Uganda includes grassy hills, swamps and lakes, and is the only area in the southwest where impala, eland, roan and zebra (Equus burchelli) still occur together. There is a considerable number of game reserves and forest reserves; the most important are shown in Fig. 2.

The history of Uganda’s three major national parks, Murchison Falls, Queen Elizabeth (both established in 1952) and Kidepo Valley (established following independence, in 1962) has been described by Kayanja & Douglas-Hamilton (1983). The successful development of these parks as the basis of a flourishing tourist industry was brought to an abrupt halt by the military coup of Idi Amin in 1971. The effects of Amin’s rule and the liberation war which overthrew the Amin government resulted in the destruction of much of the parks’ infrastructure and heavy losses of wildlife, especially in Murchison Falls and Queen Elizabeth. By 1980 the situation was bleak (Edroma 1980). The elephant (Loxodonta africana) populations of Murchison Falls and Queen Elizabeth National Parks and the rhinoceros (Diceros bicornis and Ceratotherium simum) populations of the former had suffered catastrophic reductions. Kidepo Valley National Park’s wildlife was relatively intact (Edroma 1981) but this park was threatened
by armed parties of Sudanese poachers. A combination of exceptionally dedicated national park ranger forces and timely emergency aid from the United Nations' Development Programme and the European Economic Community allowed the national parks to survive and a recovery programme to be initiated. By 1982 poaching had largely been brought under control and the basic infrastructure of the national parks re-established. Further upheavals are reported to have occurred prior to the establishment of the new government in early 1986 (Anon. 1986), but the national park authorities have since resumed control.

Large numbers of antelopes were poached for meat in the national parks during the 1970s and some of the parks' antelope populations suffered substantial reductions, but to a lesser degree than elephant and other very large mammals. All of the antelopes represented in the national parks have survived in sufficiently

| Table 1 |
| Current Status of Antelopes in Uganda |

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<th>Species</th>
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<tr>
<td>Bushbuck</td>
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<td>Giant Eland</td>
<td>E/E</td>
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<td>Common Eland</td>
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<td>Bohor Reedbuck</td>
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<td>Sitatunga</td>
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<td>Bay Duiker</td>
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<td>White-bellied Duiker</td>
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<td>Yellow-backed Duiker</td>
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<td>Bates' Pigmy Antelope</td>
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<td>Weyns' Duiker</td>
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<td>Impala</td>
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<tr>
<td>Grey Duiker</td>
<td>S</td>
<td>Grant's Gazelle</td>
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*Ex = extinct, En = endangered, R = rare, V = vulnerable, I = indeterminate (i.e., endangered, rare, or vulnerable); K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.
large populations to regain their former numbers with the resumption of effective protection. The recent establishment of Lake Mburo National Park, purely on the initiative of the local people, is an important symbol of the recovery of Uganda's conservation areas (Kingdon 1985).

The game reserves and forest reserves have suffered badly from neglect during the last 10–15 years, with adverse effects on the wildlife populations (e.g., Vernier & Jenik 1984). Changes in land tenure legislation and population pressure in Kigezi and elsewhere has led to substantial immigration into virtually all formerly unsettled land. Whereas local residents often maintain their respect for traditional reserves (such as the obsolete local Authority Forest Reserves and ancestral groves that are taboo) new colonists seldom observe such customary restraint. With the breakdown of morale in the Forests and Game Departments massive incursions in former reserve areas are general, accompanied by extensive hunting and snaring of antelopes.

In the face of ever-expanding human settlement, many of the forest reserves are now in an acutely precarious state because of exploitation for timber, clear-felling of natural forest for replacement with exotic conifers, deforestation for agricultural development, and/or intense hunting pressure for forest primates and ungulates (e.g., Struhsaker 1981; Harcourt 1981; Kingdon 1971, 1982; Yeoman 1985; Howard 1986; Van Orsdol 1986). Some forests, e.g., Kibale (Van Orsdol 1986) and Bwamba (Semiliki), have suffered severely from agricultural encroachment; in other cases excessive logging (pit-sawing) and hunting are the major problems, e.g., Kalinzu, Kasaya-Kitomi, Ruwenzori, Itware; a few forests, e.g., Maramagambo, are still relatively undisturbed (Howard 1986).

These developments threaten the survival of at least some forest-dependent antelopes in Uganda. In some forest reserves, e.g., Bwindi, very heavy hunting pressure has reduced forest antelope populations to low levels (although hunting is now largely under control in Bwindi, which should allow antelope populations to recover there); in other forests, e.g., Kibale, duikers and bushbuck remain common despite frequent hunting (T. Butynski in litt. January 1987).

**Conservation Measures Proposed**

Continued efforts to repair the basic infrastructure and essential services of the national parks, and to stamp out poaching, remain a high priority. In contrast to the destruction of woodland in Uganda's national parks caused by elephant overpopulation during the 1960s (e.g., Laws et al. 1970), a major management problem now facing Murchison Falls and Queen Elizabeth National Parks is the need to control the profuse regeneration of woody vegetation which has followed the severe reduction of elephant numbers by poachers in the 1970s (Lock 1985; Smart et al. 1985).

A recent EEC grant of U.S. $2.2 million to help rehabilitate the national parks and reinforce the Uganda Institute of Ecology illustrates the high level of international support. This augurs well for the development of an effective conservation system which ensures the future of Uganda's wildlife while taking into account the legitimate needs of the people. A return to political stability and the eventual resumption of large-scale tourism will re-establish the economic value of the national parks.

There is an urgent need to extend Uganda's national parks to include representative examples of the forest ecosystems, e.g., the Bwindi (impenetrable) forest. This forest contains the last viable population of gorillas (Gorilla gorilla) in Uganda and supports one of the greatest concentrations of rare forest animals and plants in Africa (Harcourt 1981; Kingdon 1983). Several of Uganda's other forest reserves are not only vital for the survival of forest antelopes within East Africa but are of major international importance in primate conservation, e.g., Kibale and Bwamba (Kingdon 1971; Struhsaker 1981). Continued international assistance to the development of conservation and utilisation programmes in forests such as Kibale and Bwindi and the extension of these programmes to other forests of western Uganda (Howard 1986) are vital.

An informed populace is an essential cornerstone of successful nature conservation. Greatly increased efforts are required to educate the people of the practical need for the conservation of natural ecosystems such as forests and savannas. Struhsaker (1981) pointed out the need to revise the school curriculum in East Africa to meet this need. The rapidly expanding network of wildlife clubs in Uganda is an encouraging sign for the future. The desperate need to conserve the surviving remnants of East Africa's natural life-support systems has been discussed in detail elsewhere (Kingdon 1971; 1982, appendix I).

**Species Accounts**

**East Africa** is one of the major centres of wildlife research in Africa. There is now a large amount of published information on the ecology of the region's large mammals, including antelopes. Aspects such as habitat, food, reproduction, dispersion and seasonal movements are covered elsewhere, e.g., in an evolutionary context by Kingdon (1982). This account concentrates on distribution, population and conservation status.

In the following accounts of individual species, estimated populations and status in conservation areas are based on the following sources unless otherwise indicated: Bere (1958), Laws et al. (1970), Ross et al. (1976), Eltringham & Din (1977), Van Orsdol (1979), Shorter (1980), Bendabili in Decter (1981), Harrison (1983), Vernier & Jenik (1984). Information on the current situation has been obtained from the author's extensive travels in western Uganda over the last three years, and from talks with numerous Game Department and National Parks staff and others on the overall status of wildlife. In addition to the author's observations, T. Butynski (in litt. January 1987) provided information on the status of antelopes in Kibale and Bwindi Forests.

**Bushbuck (Tragelaphus scriptus)**

**Distribution & Population:** Widespread except for parts of the arid northeast, in suitable thicket or forest habitat (Fig. 3). Numbers unknown, but locally abundant, e.g., Waser (1975) estimated a population density of 26 per sq km in a well-bushed area of Mweya Peninsula in Queen Elizabeth National Park. Tsetse extirmination campaigns in Ankole and Masaka revealed a population density of at least 4.6 per sq km in an area of 3000 sq km with extensive grasslands and other habitats only marginally used by bushbuck.

**Status:** Satisfactory. Able to withstand heavy hunting pressure and survives in settled areas with a small amount of cover.

**Conservation Measures Taken:** Occurs in all the national parks, game reserves and forest reserves, with the exception of Mathevuko Game Reserve. Common in some conservation areas, e.g., Kibale Forest Reserve, but rare and localised in others, e.g., Bwindi Forest Reserve.

**Giant Eland (Tragelaphus derbianus)**

**Distribution & Population:** Confined to a small area in the extreme northwest, west of the Nile (Fig. 3), where it formerly occurred both as a seasonal immigrant from the Sudan and Zaire and in permanently resident populations (Kingdon 1982). It was reported to have been eliminated from Uganda during military operations in 1970. As a nomadic species it could recolonise some of its former habitat from the Sudan, where it still occurs widely in small numbers.
Fig. 3. Distribution of antelopes in Uganda. Dotted lines indicate limits of former distribution; shaded areas indicate distribution in 1975 (after Kigungu 1982). For forest duikers (Cephalophus spp.), mountain reedbuck, and Bates’ pigmy antelope, shaded areas represent the approximate limits of the recorded distribution, not the area of continuous occurrence.

**Status**: If it re-enters Uganda this species will be threatened by hunting for meat, and also by rinderpest, to which it is highly susceptible. Its habitat in Uganda does not receive effective protection in any conservation areas.

**Common Eland (Tragelaphus oryx)**

**Distribution & Population**: Occurs in northeastern and southwestern Uganda (Fig. 3). Numbers are unknown, but occurs at low population densities. In the Ankole-Masaka tsetse clearance scheme, 646 eland were killed in an area of 3000 sq km; this suggests a density of less than 0.2 per sq km, since eland are highly nomadic and many of those killed probably ranged over a much wider area.

**Status**: Vulnerable, in view of its low density, wide nomadic movements, and the threats of poaching and rinderpest.

**Conservation Measures Taken**: Occurs in Kidepo Valley National Park (population 150–800), Laki Mburo National Park (small numbers), and Kadam-Debasien, Katonga and Bokora Game Reserves.

**Bongo (Tragelaphus eurycerus)**

**Distribution, Population & Status**: This species formerly occurred in the rainforests on Mount Elgon (Fig. 3), but was exterminated on the Uganda side of the mountain in 1913–14. It is possible that it once occurred in southwestern Uganda in the Bwamba forest, which is contiguous with the vast Ituri forest of Zaire. Bongo occurs in Ituri, but it no longer exists on the Uganda side of the border.

**Lesser Kudu (Tragelaphus imberbis)**

**Distribution & Population**: Confined to thicket vegetation in the semi-arid northeast (Fig. 3), where it tends to replace the bushbuck. Occurs in small numbers.

**Status**: Rare. This species has been deprived of its habitat in some areas by the expansion of agriculture into marginal lands and consequent vegetation clearance, and widespread felling and burning of trees for charcoal. This loss of habitat has been balanced to some extent by the effects of overgrazing by domestic livestock on semi-arid rangelands, which encourages the growth of thicket.

**Conservation Measures Taken**: Occurs in small numbers in Kidepo Valley National Park, where it is threatened by heavy destruction of bush by elephants, and in Kadam-Debasien, Bokora and Matheniko Game Reserves.

**Greater Kudu (Tragelaphus strepsiceros)**

**Distribution & Population**: Confined mainly to stony, hilly country in the northeast (Fig. 3), where it occurs in small numbers.

**Status**: Rare.

**Conservation Measures Taken**: Occurs in very small numbers in Kidepo Valley National Park, and in Matheniko Game Reserve.


**Sitatunga (Tragelaphus spekii)**

*Distribution & Population*: Occurs in swamps associated with the extensive lake and river systems and forests of Uganda (Fig. 3). This species was formerly extremely abundant on Bugalla, Fumve, Bubembe, and Nkosi Islands within the Sseesse Islands group in Lake Victoria (Kingdon 1982). Present numbers are unknown, but it is probably more numerous than generally supposed. It has been exterminated in some of the smaller, more accessible swamps, but still occurs in considerable numbers in some areas, e.g., the Lake Victoria swamps (Vorath 1983). It can survive close to human settlement as long as its cover is not removed, e.g., R.H.V. Bell has observed the sitatunga’s characteristic network of tracks in marshes on the glideway to Entebbe International Airport.

*Status*: The secretive habits and inaccessible habitat of the sitatunga make it difficult to assess this species’ status. Although undoubtedly still present in substantial numbers in some parts of Uganda, it is hunted relentlessly with dogs, fire and nets and by snares (Kingdon 1982; Vorath 1983).

*Conservation Measures Taken*: Not well represented in conservation areas. Probably occurs in small numbers in swamps within Queen Elizabeth, Lake Mburu, and Murchison Falls National Parks. Also occurs in a Sitatunga Sanctuary on Nkosi Island, and in some of the forest reserves on the mainland, e.g., Kibale and Bugoma.

**Bay Duiker (Cephalophus dorsalis)**

*Distribution, Population & Status*: This duiker is widespread in the lowland rainforests of Zaire and further west. There is a single record from Uganda, from gallery forest below the northwestern foothills of the Ruwenzori Mountains (Fig. 3). This area, lying between the Bwamba and Ruwenzori Forest Reserves, is now so densely cultivated that the species is unlikely to survive there.

**White-bellied Duiker (Cephalophus leucogaster)**

*Distribution, Population & Status*: This species is widespread in the lowland rainforests of central Africa. It may have occurred in some of the forests of southwestern Uganda, e.g., Bambwa (Fig. 3), since it has been recorded from the Ituri forest just across the Zaire border. Recent enquiries from local hunters and Game Department staff elicited no knowledge of this species and it is unlikely to survive in Uganda.

**Blue Duiker (Cephalophus monticola)**

*Distribution & Population*: Occurs widely in both lowland and montane forests (up to 3000 m) in Uganda (Fig. 3). Numbers unknown, but locally common in suitable habitat with moderate to dense undergrowth. It can survive in small forest patches and narrow gallery forests as long as they are moist enough or it has access to water.

*Status*: Not threatened, although it is frequently netted and snared. *Conservation Measures Taken*: Occurs in most of Uganda’s legally protected forests, e.g., the forest zones of Murchison Falls and Queen Elizabeth National Parks, Kigezi, Kibale Corridor and Kyambura Game Reserves, and Kibale, Mount Elgon, Ruwenzori Mountains, Budongo, Bwamba, Sango Bay, Mabira, Maramagambo-Kalinzu, Kasoyo-Kitomi, Bugoma and Itwara Forest Re-
is undoubtedly threatened by severe hunting pressure and destruction of its forest edge habitat.

Yellow-backed Duiker (Cephalophus silviculis)

Distribution & Population: Occurs in montane (Bunyamwera, Bwindi) and some lower altitude forests (Maramagambo, possibly Bwamba) in the southwest, and possibly on Mount Elgon (Fig. 3). Numbers unknown, but formerly quite common locally in suitable habitat (Kingdon 1982).

Status: Formerly taboo as a game animal in Kigezi, but massive poaching by Zairois in most borderland forests has greatly depleted this species. It is now endangered in Uganda by the intensive, persistent hunting and trapping which occur in most of its haunts.

Conservation Measures Taken: Occurs in the Maramagambo Forest, which lies mainly within Queen Elizabeth National Park and Kigezi Game Reserve, and in Bwindi Forest Reserve. Possibly occurs in Maramagambo-Kalinzu, Kasyooha-Kitomi, Bwamba and Mount Elgon Forest Reserves. Also present (at least formerly) in Bunyamwera Gorilla Sanctuary. Renewed control over hunting, e.g., in the Bwindi Forest, may allow the species to recover.

Weyms' Duiker (Cephalophus weymi)

Distribution & Population: Sometimes regarded as the eastern subspecies of Peters' duiker (C. callipygus weymi), this duiker is widely distributed in the forest relics north of Lake Victoria (Fig. 3). Numbers unknown, but locally common in many Uganda forests, where this species and bushbuck are often the dominant bovids.

Status: Satisfactory. Widely hunted for meat and hides but remains locally common, e.g., in Kibale Forest. Its long-term survival depends on the persistence of its forest habitats.

Conservation Measures Taken: Occurs in the Maramagambo Forest within Queen Elizabeth National Park, and in several forest reserves, e.g., Kibale, Mount Elgon, Budongo, Maramagambo-Kalinzu, Kasyooha-Kitomi, Bugoma and Itwara.

Grey Duiker (Sylvicapra grimmia)

Distribution & Population: Occurs throughout Uganda in areas with suitable bush or thicket cover; absent from dcnsc forest (Fig. 3). Numbers unknown, but this species is very common. It has probably benefited from the widespread destruction of larger ungulates and the removal of their influence on the vegetation. This has resulted in an increase in the amount of cover and a superabundance of browse, which is the basis of this species' food supply.

Status: Not threatened. Has maintained its distribution and probably maintained or increased its numbers. Able to withstand heavy hunting pressure and continues to flourish on cultivated land with a small amount of cover and even in suburban habitats.

Conservation Measures Taken: Common in the national parks, and occurs in all the game reserves and in several forest reserves, e.g., Mount Elgon (on the moorlands), Budongo, Sango Bay, Mabira and Bugoma.

Waterbuck (Kohus ellipsiprymnus defassa)

Distribution & Population: Formerly widespread; distribution now greatly contracted and centred on conservation areas (Fig. 3). The total population is probably of the order of several thousand to more than 10,000.

Status: Satisfactory, as long as effective protection is maintained in the national parks and game reserves.

Conservation Measures Taken: Its main stronghold in Uganda is Queen Elizabeth National Park, where the males grow exceptionally long horns; this population numbered about 4500 in the early 1970s, subsequently suffered a considerable reduction, but is gradually recovering. Waterbuck are also well represented in...
Murchison Falls National Park, where the population of 1800 was not severely affected by the heavy poaching of the 1970s, and in Kidepo Valley National Park (population about 500). It has suffered severely from poaching in Toro Game Reserve, its numbers having been reduced from 540 in 1969 to a few tens of animals in 1978. It also occurs in Lake Mbugo National Park, the game reserves adjacent to Queen Elizabeth National Park (Kigezi, Kibale Corridor and Kyambura) and Murchison Falls National Park (Karuma and Bugungu), Kadam-Debasien and Kafong Game Reserves, and some forest reserves, e.g., Sango Bay.

Kob (Kobus kob)

**Distribution & Population:** This antelope, highly characteristic of Uganda’s low-lying and gently rolling savanna grasslands close to permanent water, has now been displaced from most of its former range by agricultural and ranching development. It is now restricted to three main areas, in and around Queen Elizabeth and Murchison Falls National Parks and Toro Game Reserve (Fig. 3). It is the most numerous antelope in each of these conservation areas. The total population numbers in the tens of thousands. The Ugandan subspecies is *K. kob thomasi*; vagrants of the white-eared Sudanese race *K. kob leucotes* have been recorded in Kidepo Valley National Park and elsewhere in northern Uganda.

**Status:** Satisfactory, as long as effective protection is maintained in the conservation areas where it occurs. This species responds very well to protection and builds up its numbers very rapidly, but it is highly susceptible to hunting.

**Conservation Measures Taken:** Abundant in Queen Elizabeth and Murchison Falls National Parks and in parts of the adjacent game reserves (Kigezi, Kibale Corridor, Kyambura, Karuma and Bugungu). The population of about 12 000 in Queen Elizabeth National Park was reduced by poaching to about 7000 in the late 1970s but has subsequently increased. In the Murchison Falls area, kob appear to have maintained or increased their numbers during the 1970s, e.g., in 1980 the population of the southern section of the national park was estimated at 10 400 (compared to 2600 estimated in 1967), with a further 20 300 to the north of the Nile. The population of Toro Game Reserve was reduced by overhunting from approximately 18-20 000 in the late 1960s to 2500 in 1978; a reduction of hunting pressure is essential if this population is to survive (Verner & Jenik 1984).

**Additional Remarks:** This species appears to have high potential for sustained-yield cropping and could become a valuable natural resource and source of protein if effective wildlife management policies can be developed and implemented.

Bobur Reedbuck (Redunca redunca)

**Distribution & Population:** Formerly throughout, except for dense forest and the semi-arid northeast. Still occurs widely in small numbers, but eliminated from the more densely settled areas (Fig. 3).

**Status:** Vulnerable; it occurs at low densities in Uganda, and populations continue to decline even in some conservation areas.

**Conservation Measures Taken:** Occurs in small populations in all the national parks, and in all the game reserves except Boroka and Matheniko. In Queen Elizabeth National Park, where redbuck occur mainly in the vicinity of heavily settled fishing villages, the population was reduced by poaching from 350 in 1974-75 to about 85 (and still declining) in 1984 (Edroma & Kenyi 1985). The population of Toro Game Reserve was similarly reduced from about 40 in 1969 to perhaps 10-15 in 1978.

Mountain Reedbuck (Redunca fulvorufa)

**Distribution & Population:** Confined to grassy hillsides and broken rocky country in the northeast (Fig. 3), where it is uncommon.

**Status:** Endangered. Occurs in small numbers and may be threatened by recent droughts which affected its Ugandan range. Its occurrence in small, sedentary, isolated populations, and very limited dispersal ability place it in danger of localised extinction because of an incapacity to escape climatic or other local vicissitudes.

**Conservation Measures Taken:** This redbuck occurs locally in the eastern part of Kidepo Valley National Park, and in Kadam-Debasien Game Reserve.

Roan (Hippotragus equinus)

**Distribution & Population:** Formerly occurred locally in the north, east and southwest, but now confined to three relatively small areas (Fig. 3), where its surviving populations are small.

**Status:** Threatened by poaching and loss of habitat to human settlement. This species’ survival in Uganda is dependent on effective protection of the small remnant populations occurring in conservation areas.

**Conservation Measures Taken:** Occurs in low numbers in Kidepo Valley and Lake Mbugo National Parks and Kadam-Debasien Game Reserve.

Beisa Oryx (Oryx gazella beisa)

**Distribution & Population:** Confining to semi-arid savanna, thornbush and grassland in the northeast (Fig. 3). Numbers unknown, but the Ugandan population of this species is not large.

**Status:** Although it is well adapted to seasonally arid habitats, it probably has been adversely affected by habitat degradation caused by overgrazing of domestic livestock and recent severe droughts.

**Conservation Measures Taken:** Occurs in Boroka and Matheniko Game Reserves.

Lelwel Hartebeest (Alcelaphus buselaphus leelwel)

**Distribution & Population:** Formerly widespread in the northerly savannas, where it was the most abundant large antelope; now confined mainly to conservation areas (Fig. 3). The total population numbers well into the thousands.

**Status:** Satisfactory in the national parks. This species is highly susceptible to hunting and competition from cattle. Its survival in Uganda depends on effective protection in conservation areas.

**Conservation Measures Taken:** Occurs in Murchison Falls National Park and the adjacent Karuma and Bugungu Game Reserves, and in Kidepo Valley National Park (population 1000-1500). The population of approximately 4600 in Murchison Falls National Park, its main Ugandan stronghold, maintained its numbers reasonably well during the 1970s, and the species is still well represented there. In contrast, its susceptibility to hunting is demonstrated by its recent extermination by poachers in Toro Game Reserve, where a population of 650 existed in 1969.

Topi (Damaliscus lunatus jimela)

**Distribution & Population:** Has always had a very localised distribution in Uganda, and now occurs in four separate areas (Fig. 3). In the northeast the subspecies *D. l. tiang* occurs only as a vagrant from the Sudan. The total population is no more than a few thousand.

**Status:** Vulnerable. The main population in the southwest has undergone a marked recent decline.

**Conservation Measures Taken:** The species’ major Ugandan population is confined to an area of about 80 sq km in the southern sector of Queen Elizabeth National Park and the contiguous Kigezi Game Reserve. This population declined from about 5000 to about 2500 between 1975 and 1977, because of poaching, and massive regeneration of *Acacia sieberiana* woodland in its preferred grassland habitat following the destruction of elephants (Voscel & Van Orsdol 1981). Topi also occur in Kadam-De-
basien Game Reserve, and Lake Mburo and Kidepo Valley (vagrant) National Parks.

Klipspinger (*Oreotragus oreotragus*)

**Distribution & Population**: Confinned to rocky outcrops and hillsides in the northeast and southwest (Fig. 3), where it occurs in small numbers.

**Status**: Rare.

**Conservation Measures Taken**: Occurs locally in suitable habitat within Kidepo Valley and Lake Mburo National Parks, and Kadam-Debasien Game Reserve.

Guenther's Dikdik (*Madoqua guentheri*)

**Distribution & Population**: Widespread in the semi-arid northeast (Fig. 3). Numbers unknown, but locally common in suitable thicket habitat.

**Status**: Probably satisfactory, but there is insufficient information to assess its current status. Although hunted widely, this species has benefited from ecological changes such as expansion of evergreen scrub wrought by overgrazing, and by the fallow and disturbed vegetation that accompanies the spread of human settlement.

**Conservation Measures Taken**: Occurs in Kidepo Valley National Park, and Kadam-Debasien, Bokora and Matheniko Game Reserves.

Oribi (*Ourebia ourebi*)

**Distribution & Population**: A characteristic species of Ugandan savannas, where it was formerly very widespread; still occupies a considerable part of its former range (Fig. 3). Numbers unknown, but formerly abundant in some localities and still locally common within conservation areas.

**Status**: Satisfactory in conservation areas, but probably declining elsewhere. Does not persist in densely settled areas as it is vulnerable to hunting.

**Conservation Measures Taken**: Formerly occurred in large numbers in Murchison Falls National Park, where its population declined during the 1970s but has since recovered to some extent. Also occurs in Kidepo Valley National Park, where it is common, Lake Mburo National Park, and Torro, Kadam-Debasien, Ajati, Karuma, and Bugungu Game Reserves.

Steenbok (*Raphicerus campestris*)

**Distribution, Population & Status**: This species formerly occurred in a small area of eastern Uganda (Fig. 3), at the northwestern extremity of its range in eastern and southern Africa. If it still occurs in Uganda it is undoubtedly endangered. The area it formerly occupied is now intensively settled and an lionelopes of open country have largely been exterminated.

Bates' Pigmy Antelope (*Neotragus batesi*)

**Distribution & Population**: Confined to lowland rainforests in the southwest (Fig. 3), where it is very scarce.

**Status**: Like other forest rarities, this species is threatened by habitat destruction. Although it is occasionally captured in snares and nets, it is sufficiently rare in Uganda to be virtually unknown to all but the more experienced hunters in the forests where it occurs.

**Conservation Measures Taken**: I has been recorded in Maramagambo Kalinzu, Kasoyo-Ki-tomi, Kibale and Bwamba Forest Reserves; may also occur in Budongo and Itwara Forest Reserves.

Impala (*Aepyceros melampus*)

**Distribution & Population**: Only known from two small areas in Uganda, in the northeast and southwest (Fig. 3).

**Status**: Threatened by hunting and the expansion of human settlement into the areas in which it still occurs.

**Conservation Measures Taken**: Occurs in good numbers in the recently gazetted Lake Mburo National Park. Adequate protection of this remnant population is essential for this species' survival in Uganda.

Grant's Gazelle (*Gazella granti*)

**Distribution & Population**: Confined to the semi-arid northeast (Fig. 3), where it is still widespread in low to moderate numbers.

**Status**: There is insufficient information to assess this species' status. It has undoubtedly been affected detrimentally by habitat degradation caused by overgrazing of domestic livestock throughout most of its range in northeastern Uganda.

**Conservation Measures Taken**: Occurs in Kidepo Valley National Park (population 4-600) and Matheniko Game Reserve.

References


**Chapter 8: Kenya**

J.C. Hillman, G.R. Cunningham-van Someren, C.G. Gakahu & R. East

**Introduction**

Kenya has a wide range of climates for its relatively small size. Mean annual rainfall varies from less than 250 mm in parts of northern Kenya to more than 1500 mm in the southwest, and more than 2000 mm in some montane areas. The topography is dominated by the eastern Rift Valley, which is bordered by steep escarpments and has a series of lakes on its floor, some fresh water, e.g., Lakes Naivasha and Baringo, and some alkaline, e.g., Lakes Turkana, Nakuru, and Bogoria. Natural vegetation (Fig. 1) ranges from arid bushland and semidesert typical of the Horn of Africa in the north, to moist forest, which occurs on the higher Rift Valley escarpments and associated hills, e.g., the Mau escarpment and the Cherangani range, on isolated mountains formed by volcanic action, e.g., Mount Kenya and Elgon, in the Lake Victoria basin, e.g., Kakamega Forest, and in relic patches along the coastline, e.g., Arabuko-Sokoke Forest, Shimba Hills.

Human population density varies from less than 5 persons per sq km in the arid north to more than 250 per sq km in parts of the moist southwest and the central highlands north of Nairobi. Livestock densities follow a similar pattern, although the ratio of livestock to human numbers is greatest in the drier northern and eastern regions, reflecting the primary importance of livestock in areas too dry for intensive arable agriculture (Peden 1984). Settlement and agricultural development have excluded most wildlife from southwestern Kenya and the central highlands, except for isolated forests. Districts which retain substantial rangeland wildlife populations (Peden 1984) are indicated in Fig. 2; in many of these districts the more common antelopes are still widespread and numerous outside conservation areas.

Kenya’s conservation areas (Fig. 2) include many internationally famous national parks and reserves. Wildlife-based tourism is a major foreign exchange earner. At present, the tourist industry provides the major impetus for the maintenance of wildlife conservation areas in the face of rapid human population growth and expansion of settlement. These areas are becoming increasingly important for the long-term survival of wildlife, especially in the south where encroachment on to the remaining unprotected wildlife habitats is occurring much more rapidly than in the sparsely populated north. While management of most of the conservation areas on the main tourist routes is generally adequate, a shortage of trained staff and equipment prevents effective management of many of the lesser known parks and reserves.

**Current Status of Antelopes**

Kenya’s antelope fauna comprises 34–37 species (Table 1), a larger number than any other country, including Sudan and Tanzania, which also have very diverse antelope faunas and are about two to four times larger. This rich fauna reflects the variety of ecological zones (Fig. 1) and antelope habitats.

The wooded (*Acacia* spp. often dominant) and open grassland of southwestern Kenya, which includes some high altitude grassland, was formerly dominated by the Maasai (predominantly non-hunting pastoralists) and supported spectacular wildlife populations. Substantial populations of large wild animals still occur in parts of this zone, viz., Narok, Kajiado and Lakiipia districts, which together with Taita Taveta district in the southeast support Kenya’s largest surviving antelope populations. Characteristic antelopes of the southwestern grassland zone include wildebeest (often in large migratory herds), topi, hartebeest, eland, impala, Thomson’s and Grant’s gazelles. The moist savannas and swamps in the far southwest around Lake Victoria were formerly inhabited by kob, bohor reedbuck, roan, hartebeest, topi, sitatunga and oribi, but most wildlife has now been eliminated from this densely settled region.

The sparse thornbush (mainly *Acacia* and *Commiphora* species) and semidesert (which includes some areas of true desert) of arid northern and eastern Kenya (Fig. 1) is similar to the habitats of the southern Ethiopian lowlands and Somali plateaux. This region of Kenya retains substantial antelope populations, despite wide-spread poaching and excessive numbers of domestic livestock which threaten to permanently degrade the habitat (Crees 1984). Characteristic antelopes of this zone include oryx, lesser kudu, gerenuk, Grant’s gazelle, and Guenthner’s dikdik. Hirola occurs only on the southeast edge of this zone, east of the Tana River. The area of arid and semi-arid bushland south of the Tana River (Fig. 1) contains relatively dense *Acacia Commiphora* thornbush (nyika). In addition to arid zone antelopes, eland, hartebeest, Kirk’s dikdik and impala are also common in parts of this nyika bushland, which Brown (1965) recognised as a distinctive ecological zone.

The forest-savanna mosaics of the coastal strip are inhabited by sable, topi, oribi and grey duiker. Lamu district contains large numbers of topi and substantial populations of other species such as waterbuck and oribi. Bushbuck, suni, and three duiker species (*Adues*, blue, and Harvey’s red) occur in the thickets and/or relic coastal forests. Kenya’s montane forests are also an important habitat of forest antelopes, including bongo, bushbuck, suni, and several species of forest duikers. The current conservation status of the majority of Kenya’s antelopes is satisfactory (Table 1). All of the species whose status is not listed as “satisfactory” in Table 1 have localised distributions within Kenya. Those listed as “rare” in Table 1 are known or likely to occur in relatively small but stable populations within conservation areas, whereas those listed as “vulnerable” or “endangered” may not. Kenya is marginal to the range of Abbott’s duiker, Salt’s dikdik and Soemmerring’s gazelle.

**Conservation Measures Taken**

Kenya’s national parks and reserves (Fig. 2) include several areas of major international importance in the conservation of antelopes and other wildlife. The vast semi-arid Tsavo National Park contains extensive areas of dense *Acacia/Commiphora* bush and woodland, areas of less densely bushed and open grassland, and smaller areas of riverine woodlands. It is divided into two management units, Tsavo West National Park which is less arid
and has more grassland, and Tsavo East National Park which is predominantly grassed bushland. Tsavo and its history have been described by Simon (1962), Cobb (1980a) and Parker (1983). Elephant (Loxodonta africana) overpopulation of Tsavo in the 1960s and early 1970s was alleviated by the reductions in elephant numbers caused by severe drought in 1970–72 and a poaching epidemic in 1977–78. The latter reduced elephant numbers by about 50% and almost totally decimated Tsavo’s formerly large black rhinoceros (Diceros bicornis) population. In contrast, Tsavo’s antelope populations have not suffered as severely from either drought or poaching during the last 20 years. Grazing species have benefited from the conversion of woodland to grassland. Although population densities are not high in this largely waterless national park, because of its very large area it contains Africa’s largest protected populations of several antelope species adapted to semi-arid habitats, including lesser kudu, gerenuk, fringe-eared oryx, and probably dikdik, as well as some of the largest protected populations in Africa of Coke’s hartebeest, Grant’s gazelle, impala and eland.

Several conservation areas in northern Kenya are also of international importance for protecting the habitats of arid and semi-arid zone wildlife, including antelopes and other large herbivores such as Grevy’s zebra (Equus grevyi). Notable examples are Sibiloi National Park, Meru National Park and the adjacent Rahole and Kora National Reserves, Samburu-Isiolo and Shaba National Reserves, and Arawale National Reserve which is important for the conservation of the near-endemic hirola. Meru and Samburu-Isiolo are situated on the ecotone between the southwestern grassland zone and the arid northern thornbush, and contain faunal elements of the former, e.g., substantial populations of impala, hartebeest and/or waterbuck.

Masai Mara National Reserve protects much of the dry season range of the enormous migratory herds of wildebeest and zebra (Equus burchelli) which spend the rest of the year across the Tanzania border in Serengeti National Park and adjacent reserves. Masai Mara contains large resident populations of other antelopes characteristic of the southwestern grassland zone, such as topi,
impala and Thomson’s gazelle. The Serengeti-Mara ecosystem has changed from open grassland to dense woodland and back to grassland in the last 100 years. Factors influencing the woodland dynamics were reviewed by Dublin (1984). On a smaller scale, Amboseli and Nairobi National Parks protect the dry season ranges of other migratory wildebeest and zebra populations, and populations of more sedentary species, e.g., hartebeest, impala, Grant’s and Thomson’s gazelles. The future of these dry season concentration areas for migratory ungulates is threatened by such developments as the rapid expansion of human settlement around Nairobi National Park, competition for forage and water between wild and domestic herbivores in the areas surrounding Amboseli National Park and Masai Mara National Reserve, and expansion of wheat farming to the north of Masai Mara.

Lambwe Valley National Park contains one of the few surviving remnants of the wildlife of the Lake Victoria region, including roan, topi, hartebeest and oribi. There are no national parks of significance for antelope conservation in the coastal strip, but Shamba Hills, Tana River and Boni-Dodori National Reserves contain habitats of some of the antelopes of this zone, including sable and topi.

Moist forest is protected within three national parks. Mount Elgon National Park extends from the upper level of cultivation at 2000 m on the eastern flank of the mountain through montane forest to dense bamboo thickets at about 3000 m and the Afroalpine moorland zone above. Aberdare National Park comprises mainly bamboo, Hagenia and Hypericum scrub, and open woodland above 3000 m, but includes about 75 sq km of montane forest in its eastern salient, which extends down to the lower edge of the forest at 2000 m. Kakamega Forest National Park consists of medium altitude forest (1520–1680 m). Between them, these three national parks protect populations of most of Kenya’s forest antelopes, viz., bongo, bushbuck, suni, and blue, Harvey’s red, black-fronted, yellow-backed (if it occurs on Mount Elgon) and Weyns’ duikers. Mount Kenya National Park contains the upper part of the mountain above about 3000 m, including the uppermost bamboo and the Afroalpine zone but no forest; black-fronted and grey duikers, steenbok and klipspringer are permanently resident on its moorlands.

Other major surviving montane forests are within forest reserves, in which the level of protection is variable. Illegal tree-felling on Mount Kenya, for example, has become so excessive that the Government recently had to ban even legal tree-felling to prevent severe destruction of part of the Mount Kenya forests. In several other montane forests, poaching, logging and forest clearance for human settlement or replacement with fast-growing exotic tree species are serious threats to wildlife.

Substantial remnants of coastal forest are included in some national reserves, e.g., Shimba Hills, which contains 77 sq km of indigenous forest, and Tana River, which contains two endemic primate subspecies in its 12 sq km of forest. The important coastal forest reserve of Sokoke-Arabuko, which contains relic species including Aders’ duiker, unique birds and other taxa, is threatened by excessive tree-felling and pressure from adjacent settlements for forest products such as building poles and firewood (Kelsey & Langton 1984). Most of Kenya’s remaining fragments of indigenous forest outside the national parks are similarly threatened by overexploitation and deforestation (Brown 1981; Collins & Chilton 1984), including those within national reserves such as Marsabit (Crees 1984), Shimba Hills (Ross 1985), and Boni-Dodori. Illegal felling of forest ungulates is widespread in forest reserves, e.g., Sokoke-Arabuko, and some national parks, e.g., Kakamega.

**Conservation Measures Proposed**

Kenya’s system of national parks and reserves provides the basis for effective protection of representative examples of most of the country’s antelope species and their habitats. Continued improvement and refinement of this system and its management, including the development and application of new methods and concepts to improve conservation of the parks and reserves and the wildlife they contain, are essential if further advances in wildlife conservation are to be achieved. Increases in staff numbers and funding are required for most parks and reserves, and anti-poaching activities should also be increased. Better protection of relic forest patches is an urgent requirement. Continued international financial support for the protection and management of Kenya’s conservation areas is essential. In addition to control of poaching and human encroachment, management of tourist traffic

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* Ex = extinct; En = endangered; V = vulnerable; R = rare; I = indeterminate (i.e., endangered, rare, or vulnerable); K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.
to prevent habitat destruction and harassment of wildlife by off-road driving is now a significant problem in some of the more popular parks and reserves.

Priorities in antelope conservation include greater cooperation between Kenya and Tanzania in the management of the Serengeti-Mara and Tsavo West-Mkomazi ecosystems, which are of major international importance to antelope conservation, and improved management of specific reserves to protect threatened species, e.g., Sokoke-Arabuko Forest Reserve (Aders' duiker), Lambwe Valley National Park (roan), Saiwa Swamp (sitatunga), Shimbilla Hills National Reserve (sable), and Aruwale National Reserve (hirola). These are discussed below in the accounts of individual species.

A factor which is of even greater importance than improvement of the existing system of conservation areas is the need for Kenya to develop and expand conservation strategies which take more account of the needs and demands of the rapidly growing human population. Despite Kenya's many outstanding conservation achievements, its wildlife faces an uncertain future because of the human population's projected growth from about 15 million in 1979 to 35-40 million by 2010. The increasing population's demand for basic resources such as food, firewood, and grazing for domestic livestock is placing more and more pressure on Kenya's natural ecosystems. While poaching is generally under effective control at present in most of the national parks and some national reserves, human and domestic livestock populations have already reached levels where overgrazing of the surrounding areas is leading to more and more frequent incursions of people and livestock across reserve boundaries, e.g., in Tsavo National Park, Kora and Samburu-Isoilo National Reserves and elsewhere. Pressure to utilise the grasslands of Tsavo West National Park for cattle grazing, for example, is likely to have a major influence on this park's future (Cobb 1980b). Recent invasion by large numbers of cattle and other domestic livestock has severely degraded several hundred sq km in the west-central section of Tsavo West (Cheffings 1986; Locffer 1986). A solution to this problem is required urgently, to prevent the influx of domestic livestock into large areas of Tsavo. The pressures which now threaten many of Kenya's parks and reserves highlight the need for a national conservation strategy to arrest the deterioration of Kenya's natural resources (Tsangi 1986).

At present, the government's financial support for wildlife conservation is closely linked to wildlife's importance in the large and expanding tourist industry (Sindjio & Pert 1984). However, total dependence on its revenue-earning capacity makes the long-term future of the national park and reserve system highly vulnerable to any major downturns in world tourism, e.g., because of international economic recession or political instability. The great ecological value of Kenya's conservation areas requires more recognition. The national parks and reserves are the last stronghold of the country's great natural diversity of plant and animal species, which represent a genetic storehouse upon which man's survival may ultimately depend. Antelopes, for example, have considerable potential for protein production through game-farming (Stelfox 1984) or domestication (Stanley Price 1978).

It is therefore imperative that conservation strategies are developed which recognise the needs of both wildlife and local communities, involve local people in conservation decisions, and allow them to profit from and appreciate the presence of wildlife. Acceptable compromises can be achieved between the requirements of conservation and local communities, at least in areas which are too arid for intensive cultivation, e.g., Amboseli (Western 1982). In densely settled agricultural areas, most antelopes and other wildlife may only survive within fenced islands of natural habitat, e.g., the Mount Kenya and Aberdare Forest Reserves and National Parks.

Species Accounts

East Africa has been a major centre of wildlife research during the last 20 years and there is now a large amount of published information on many of Kenya's antelopes, including such aspects as habitat preferences, feeding and reproductive behaviour (see, for example, the review and synthesis by Kingdon 1982). This account concentrates on the distribution, population and conservation status of each species.

Estimates of the total population size of individual species in Kenya's rangelands given under "Distribution & Population" were calculated from the average estimates obtained from aerial censuses conducted by the Kenya Rangeland Ecological Monitoring Unit (KREMNU) in districts with significant rangeland wildlife populations (Fig. 2) between 1977 and 1983 (Peden 1984). These estimates effectively represent the approximate total populations of rangeland antelopes, since only small numbers occur in the more densely settled districts of the southwest (Fig. 2). For the purpose of this report, the estimated antelope populations for Turkana, Marsabit, Samburu, Isiolo, Mandera, Wajir and Garissa districts (Fig. 2) are combined to represent the northern part of the ard Throwthorn and semidetected zone (Fig. 1), and the estimated populations for Kitui, Tana River and Taita Taveta districts are combined to represent the nyika Throwthorn zone south of the Tana River. Similarly, Narok, Kajiado, West Pokot, Baringo and Laikipia districts are combined to represent the southwestern grassland zone (Fig. 1). All of these population estimates have wide confidence intervals and are very approximate.

Northern Kenya suffered from a severe drought in 1984. Its effects on antelopes were assessed by comparing the total population estimate obtained for each species in Marsabit, Samburu, Isiolo, Mandera, Wajir and Garissa districts combined in 1985 (KREMNU 1985) with the sum of the average estimates for each species in these districts in 1977-83.


Bushbuck (Tragelaphus scriptus)

Distribution & Population: Still occupies most of its former range, mainly in the south and southwest and coastal strip (Fig. 3). Largely confined to riverine areas along the Tana and Galana Rivers within the nyika zone and to isolated forests on hills and mountains in the north. Total population unknown but locally common.

Status: Satisfactory. Persists in settled areas with sufficient cover,
Fig. 3. Distribution of antelopes in Kenya (based on distribution in the 1970s, as presented by Kingdon (1982) and East African Wildlife Society (1977), with modifications based on the authors' observations). For each species, the shaded area represents the approximate limits of the current distribution (not the area of continuous occurrence); dotted lines indicate areas where the species may have occurred formerly but is now definitely absent. The distributions of most species have probably contracted substantially over the last decade, because of the inevitable expansion of human settlement, but insufficient information is available to indicate these recent changes on the distribution maps. Many species may now be absent from areas where they still occurred in the 1970s, e.g., bushbuck probably no longer occurs in the densely populated areas of western Kenya and much of the coastal region, and the distributions of several species (lesser kudu, oryx, gerenuk, Grant's gazelle) may have contracted in the northeastern part of the country, towards the Somali border, as a result of recent droughts. Recent information is lacking for some other areas, such as the Mau forest (blue, Weyns' and yellow-backed duikers, and bongo).

although it is now rare in much of densely settled western Kenya (East African Wildlife Society 1977).

Conservation Measures Taken: Occurs in all of the conservation areas shown in Fig. 2, except Sibiloi National Park and Lake Bogoria National Reserve. Common in many protected forests, e.g., in Aberdare National Park and Forest Reserve, Mount Kenya Forest Reserve, Mount Elgon and Kakamega Forest National Parks. Generally occurs in low to moderate numbers in conservation areas within the grassland zone in the southwest, e.g., Lake Nakuru National Park (population about 50), Masai Mara National Reserve and Amboseli National Park. However, bushbuck populations are often underestimated because of its secretive habits and preference for dense cover. In Nairobi National Park, for example, where it is common in the 10 sq km of woodland and forest in the northwest of the park, ground counts suggested a total population of about 20-30, but intensive observations by Allsopp (1978) revealed at least 75-80 bushbuck within 1 sq km of the forest, suggesting a total population of several hundred. Rare in more arid conservation areas, e.g., Tsavo National Park, Samburu-Isiolo National Reserve.

**Bongo (Tragelaphus eurycerus)**

**Distribution & Population:** Formerly occurred in montane forest and bamboo on the Aberdares, Mount Kenya, the Mau forest, the Cherangani hills, Mount Loldiani, and probably Mount Elgon (Kingdon 1982). It persists in the former three areas (Fig. 3), but has probably been exterminated elsewhere by overhunting and deforestation (Stanley Price 1969, East African Wildlife Society 1977). Its main stronghold is on the Aberdares, where the population has been estimated to exceed 500 (Kingdon 1982), although sightings at tourist lodges in the Aberdares National Park salient have become fewer in recent years. It was formerly common in the Mau forest but there is no recent information from that area. On Mount Kenya bongo occur only in small, remnant herds.

**Status:** Rare. Its future appears secure as long as the national parks and reserves to which it is confined are maintained.
Conservation Measures Taken: Occurs in Aberdares National Park and Forest Reserve, Mount Kenya National Park (marginal) and Forest Reserve, and South West Mau Nature Reserve.

Additional Remarks: This species is rare and localised throughout most of its range in West and central Africa. Continuation of the effective protection afforded to the isolated eastern populations in Kenya is of major international importance for the bongo’s long-term survival.

Common Eland (Tragelaphus oryx)

Distribution & Population: Occurs widely in wooded and open grasslands and nyika thornbush (Fig. 3). The total population is estimated to be about 50–60,000, with approximately 36,000 in the southwestern grassland zone (two-thirds of these in Laikipia district) and 10,000 in the nyika zone. Mortality and emigration during the 1984 drought reduced the relatively small numbers of eland on the southern fringe of the northern arid zone by more than 80%.

Status: Satisfactory. Well represented in conservation areas.

Conservation Measures Taken: The largest protected populations are in Tsavo National Park (3–6000) and Masai Mara National Reserve (500–2000). Occurs on the moorlands of Aberdares National Park, where the population was about 700 in the early 1960s (Brown 1965). Also present in several other national parks and reserves where numbers tend to fluctuate as eland sporadically move in and out, viz., Amboseli (0–300), Nairobi (up to 600 or more), and Meru National Parks, and Samburu-Isiolo (rare), Shaba, Rahole, Kora, Losai, Arawale and Tana River National Reserves. Reintroduced to Lake Nakuru National Park.

Lesser Kudu (Tragelaphus imberbis)

Distribution & Population: Occurs throughout most of the arid northern thornbush and nyika zones, but very localised in Marsabit district (Fig. 3). Total population estimated to be about 15,000, mainly in Mandera, Wajir, Garissa, Tana River and Kitui districts. This figure is probably an underestimate, since this species’ preference for bush cover makes it difficult to observe from the air. The recent drought reduced lesser kudu numbers in northern Kenya by about 60%.

Status: Satisfactory. Quality of habitat is improving in Tsavo East National Park, but the population remains low.

Conservation Measures Taken: Tsavo National Park contains Africa’s largest protected population of lesser kudu, estimated by ground counts to be of the order 4–8000. The populations of the lesser kudu and other woodland-dependent species may have suffered from destruction of woody vegetation by elephants in considerable areas of Tsavo during the 1960s and 70s. However, lesser kudu remains widespread at medium to high densities in the extensive areas of unmodified thornbush north of the Galana River within Tsavo East National Park. Also common in the southern part of Meru National Park, and occurs in smaller numbers in Sibiloi and Amboseli National Parks (rare), and Marsabit, Samburu-Isiolo, Shaba, Rahole, Losai and Arawale National Reserves.

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Greater Kudu (*Tragelaphus strepsiceros*)

**Distribution & Population:** Has always been rare and localised in Kenya, occurring mainly on isolated, forested hills (Fig. 3). The total population probably does not exceed several hundred. Its main strongholds include Marsabit Mountain and the eastern shore of Lake Bogoria, where numbers have increased markedly since 1963.

**Status:** Rare. Populations within some conservation areas are stable or increasing, but those in unprotected habitats are threatened by poaching and habitat destruction (East African Wildlife Society 1977).

**Conservation Measures Taken:** Occurs in Sibiloi National Park, and Marsabit, Lake Bogoria and Kora National Reserves.

Sitatunga (*Tragelaphus spekii*)

**Distribution & Population:** Formerly occurred in papyrus beds and swamps around Lake Victoria, where it may now be on the verge of extinction (there is a 1984–85 record from this area by Ecosystems Ltd.), and in the Saiwa swamp east of Mount Elgon (Fig. 3), where its habitat is protected in a small, fenced national park within a largely agricultural area. The Saiwa swamp population increased with protection from about 90–100 in 1968–69 (Owen 1970) to well over 100 in 1980 (Shorter 1980).

**Status:** Rare.

**Conservation Measures Taken:** The sitatunga's future survival in Kenya is dependent on continued protection of a viable population in Saiwa swamp, together with active management of this species' very small population (e.g., translocation to establish it in a second protected area).

Aders' Duiker (*Cephalophus adersi*)

**Distribution & Population:** Known only from Arabuko-Sokoke Forest on the Kenya coast (Fig. 3) and Zanzibar Island in Tanzania. The size of the Kenyan population is unknown.

**Status:** Vulnerable. Threatened by habitat destruction and hunting. Recent information from a professional hunter indicates that this duiker, which was formerly common in some parts of Arabuko-Sokoke, is now very difficult to locate there.

**Conservation Measures Taken:** Occurs in Sokoke-Arabuko Forest Reserve and in the 43 sq km nature reserve within this forest reserve. Logging and habitat disturbance are continuing problems in this forest, which is one of East Africa's few surviving lowland forests of substantial size.

**Conservation Measures Proposed:** There is a need to enlarge the size of the Arabuko-Sokoke Nature Reserve and to set aside a surrounding buffer zone of at least 200 sq km of the forest reserve for traditional utilisation only, in order to secure the future of this internationally important forest and its unique wildlife.

Blue Duiker (*Cephalophus monticola*)

**Distribution & Population:** Confinned to restricted areas of montane and lowland forest in the southwest and southeast (Fig. 3). Numbers unknown, but uncommon.
Status: Rare. Threatened by habitat destruction and hunting in the coastal forests, e.g., Sokoke-Arabuko, but its forest habitats are protected in two national parks.

Conservation Measures Taken: Has been recorded in Mount Elgon and Kakamega Forest National Parks (rare), Nandi (rare) and Sokoke-Arabuko Forest Reserves, and Shimba Hills National Reserve in the past, but there are few/no recent records of this species from these areas.

Harvey’s Red Duiker (Cephalophus harveyi)

Distribution & Population: Occurs locally in montane, lowland and riverine forests, coastal scrub, and other areas with thick cover within its range in central and southeastern Kenya (Fig. 3). Numbers unknown, but locally common. It is the most widespread forest duiker below about 3000 m in central Kenya (Kingdon 1982).

Status: Satisfactory. Secure populations occur in several conservation areas.

Conservation Measures Taken: Well represented in Aberdare National Park, Aberdare-Kinangop Forest Reserve, Mount Kenya Forest Reserve, and Boni-Dodori National Reserve. Also occurs in Amboseli National Park (rare), Tana River and possibly Shimba Hills National Reserves.

Black-fronted Duiker (Cephalophus nigrifrons)

Distribution & Population: Confined to Mount Kenya, where it occurs in the bamboo zone and the moister, herbaceous areas of the moorlands above about 2500 m, and Mount Elgon, where it is found in montane forest, bamboo thickets and moorlands between 2400 and 3500 m (Fig. 3); on both mountains it is most common in the bamboo zone (Kingdon 1971, 1981, 1982). Numbers unknown, but not uncommon locally. There are also museum specimens of this species from the Aberdare (G. Grubb, in litt. 14 March 1987), but there is no recent knowledge of the occurrence of this species there.

Status: Rare.

Conservation Measures Taken: This duiker’s Kenyan habitats are protected within Mount Kenya and Mount Elgon National Parks.

Yellow-backed Duiker (Cephalophus silviculter)

Distribution & Population: Occurs in montane forest and bamboo in the Mau forest in southwestern Kenya (Fig. 3). Recorded on Mount Elgon by Kingdon (1982), but there are no recent records from there. Little is known about this duiker in Kenya, where it has seldom been seen. Numbers unknown.

Status: Rare.

Conservation Measures Taken: Probably occurs in the South West Mau Nature Reserve, which is largely unexplored zoologically, and possibly in Mount Elgon National Park (doubtful).

Weyns’ Duiker (Cephalophus weynsi)

Distribution & Population: Sometimes regarded as the eastern race of Peters’ duiker (C. callipygus weynsi), this duiker occurs in isolated forests in western Kenya (Fig. 3). Numbers unknown. Kingdon (1971) stated that it is the most common duiker in montane forest on Mount Elgon.

Status: Rare. Its future depends on effective protection of the conservation areas within which it occurs.

Conservation Measures Taken: Occurs in Mount Elgon and Kakamega Forest National Parks (a researcher working in Kakamega reported sightings of a large red duiker, almost certainly this species, in 1986), and probably in South West Mau Nature Reserve where forms intermediate between this species and C. harveyi may occur (Kingdon 1982). It must be emphasized that the distribution and status of this species and other “red” duikers in Kenya are poorly understood, and will remain so until detailed surveys have been conducted, including collection and examination of fresh specimens.

Abbott’s Duiker (Cephalophus spadix)

Distribution, Population & Status: Confinied to montane forest on Mount Kilimanjaro and elsewhere in Tanzania. Kingdon (1982) stated that this species is still fairly common on Kilimanjaro in forest and high altitude swamps. It is not known whether its former or present range extends to the foothills on the Kenya side of Kilimanjaro (Fig. 3). If it does occur in this area of Kenya, it is probably threatened by hunting and habitat destruction.

Grey Duiker (Sylvicopra grimmia)

Distribution & Population: Occurs widely in a variety of habitats, from coastal scrub to alpine moorlands. Absent from dense forest, and mainly confined to a few forested hills in the northern arid zone (Fig. 3). Total population unknown. Locally common.

Status: Satisfactory. Widespread in both conservation and unprotected areas. Persists in densely settled farmland with minimal cover, even in suburbia.

Conservation Measures Taken: Occurs in all of the national parks and reserves shown in Fig. 2, except Sibiloi National Park; occurs on the moorlands of the Aberdares, Mount Kenya and Mount Elgon. Also present in some forest reserves, e.g., Mount Kalal, Mount Nyiru, Ndoto Mountains.

Waterbuck (Kobus ellipsiprymnus)

Distribution & Population: Widespread in savannas and grasslands close to permanent water in central and southern Kenya (Fig. 3). K. e. ellipsiprymnus occurs in the east and K. e. defassa in the west; intermediate forms occur in central Kenya. The total population is estimated to be about 15,000, with the greatest numbers in Narok, Laikipia, Tana River and Lamu districts. The 1984 drought reduced the small numbers of waterbuck on the southern fringe of the northern arid zone by more than 90%.

Status: Satisfactory. Well represented in conservation areas.

Conservation Measures Taken: Occurs in most of the national parks. Abundant in Meru National Park (population greater than 4000) and Lake Nakuru National Park (about 3000). Common near permanent water in Tsavo National Park (population 1–3000) and in the forest and moorland of Aberdare National Park.

Smaller numbers occur in Mount Elgon, Nairobi (70), Amboseli and Lambwe Valley National Parks. Formerly occurred in Sibiti National Park (East African Wildlife Society 1977). Also present in most of the national reserves, e.g., Masai Mara (about 500), Kora, Samburu-Isiolo (150), Shaba, Arawale, Tana River and Boni-Dodori, and in some forest reserves, e.g., Aberdare-Kinangop and Mount Keny.

Kob (Kobus kob)

Distribution, Population & Status: Formerly occurred in moist savanna grasslands in the Lake Victoria region (Fig. 3), where it has been eliminated by settlement and intensive agricultural development. Attempts to translocate the last survivors to Meru Game Reserve (as it then was) in the 1960s were unsuccessful. The species is now extinct in Kenya.

Bohor Reedbuck (Redunca redunca)

Distribution & Population: Has a scattered distribution, mainly in the southwestern grassland zone (Fig. 3). Total population unknown; not uncommon in some localities.

Status: Satisfactory, as long as considerable areas of its habitat continue to be protected within national parks and reserves.

Conservation Measures Taken: Occurs in moderate numbers in Tsavo National Park (probably a few hundred), Masai Mara National Reserve (about 250), Lake Nakuru National Park (1–300),
Meru National Park (locally common), and Aberdare National Park (common on the moorlands). Present in smaller numbers in Nairobi, Amboseli, Lambwe Valley and Hell’s Gate National Parks, and Shamba Hills National Reserve.

Mountain Reebuck (*Redunca fulvorufa*)

**Distribution & Population:** Occurs in limited areas of suitable habitat in broken, hilly country and on mountain slopes (Fig. 3). Total population unknown, but locally common, e.g., Irby (1977) reported a population of 750–1000 on a 180 sq km private ranch in Nakuru district.

**Status:** Satisfactory. The habitats of several populations are protected within national parks and reserves, but populations outside conservation areas are threatened by the expansion of agriculture on to hillsides and mountain slopes, and by poisoning (East African Wildlife Society 1977).

**Conservation Measures Taken:** Occurs in small to moderate numbers in several national parks: Aberdare (on the moorlands), Nairobi, Lake Nakuru (about 30), Tsavo (Chyulu hills), and Hell’s Gate. Also present in Masai Mara National Reserve.

Roan (*Hippotragus equinus*)

**Distribution & Population:** Eliminated from most of its former range in the southwest and scattered localities elsewhere; survives in southern Narok district and Lambwe Valley (Fig. 3). The total population is probably less than 250 animals.

**Status:** Vulnerable. This species’ survival in Kenya is dependent on effective protection of the small remnant populations within conservation areas.

**Conservation Measures Taken:** The major surviving population is in Lambwe Valley National Park (100–150), where poisoning by the surrounding high-density human population is a persistent problem. Lambwe Valley falls within the area of activity of the Lake Basin Development Authority, which has the mandate of developing the resources within the Lake Victoria basin. It is essential that Lambwe Valley is included in all assessment studies, as a single major development project could exterminate the valley’s wildlife.

Roan also occur in Masai Mara National Reserve, where there is a small, stable population of about 30 near the Isura escarpment (Jones & Downey 1980). Thirty-eight roan from the Ithanga herd (now extinct) were translocated to Shamba Hills National Reserve, well outside their natural range, in 1970–72. Only a small number survived the translocation, but they had increased to about 22 in 1978. This population subsequently declined until no roan remained in the Shamba Hills in July 1986. The failure of this translocation highlights the risk of attempting to establish protected populations outside a species’ natural range. Lack of phosphorus has been suggested as the source of the failure of the introduced roan to establish themselves in Shamba Hills National Reserve.

Sable (*Hippotragus niger roosevelti*)

**Distribution & Population:** Confined to a narrow strip of coastal hinterland, from most of which it has now been eliminated (Fig. 3). KREMU aerial surveys suggested an average population of about 550 ± 250 in 1977–83, almost all in Kwale district.

**Status:** Endangered. Threatened by poisoning and habitat destruction.

**Conservation Measures Taken:** Shamba Hills National Reserve contains the only surviving concentration of sable in Kenya. This population increased from 100–150 in the 1960s to 200–250 in the late 1970s, but has apparently declined by about 60% between 1980 and 1985. This decline can be attributed to poisoning and habitat changes caused by the lack of regular rotational burning. Sable are being displaced from formerly favourable grassland habitat within the reserve by the planting of exotic softwoods and the absence of rotational burning to prevent bush encroachment. This is forcing sable to the edges of the reserve, where they are more exposed to poisoning.

**Conservation Measures Proposed:** Shamba Hills National Reserve is jointly managed by the Forestry Department and the Wildlife Conservation and Management Department, but the former department’s policies appear to predominate. There is an urgent need to enhance the status of wildlife management within this reserve. If controlled rotational burning of the sable’s grassland habitat was implemented as a management policy, together with regular monitoring and patrolling of the reserve, Kenya’s last viable sable population would again flourish (Estes & Estes 1969; Ross 1985). This national reserve has major economic potential as a wildlife sanctuary close to large numbers of coastal tourist hotels.

Oryx (*Oryx gazella*)

**Distribution & Population:** Widespread in the northern arid and nyika thornbush zones, and in the northeast (I arkippia) and southeast (Kajiado) of the southwestern grassland zone as far west as the Rift Valley (Fig. 3). The beisa oryx (*O. g. beisa*) occurs to the north of the Tana River and the fringe-eared race (*O. g. callotis*) to the south. The total population is estimated to be about 60,000, with approximately 35,000 beisa (largest numbers in Marsabit district) and 25,000 fringe-eared (most numerous in Tana River district). This species’ ability to tolerate drought is illustrated by its relatively small decline (22%) compared to livestock and most other antelopes during the recent drought in northern Kenya.

**Status:** Satisfactory. Well represented in conservation areas and likely to remain widespread in the arid north as long as poisoning pressure does not become excessive.

**Conservation Measures Taken:** Occurs in substantial populations in Tsavo (3–15 000) and Sibiloi (1–2000) National Parks. Common in Samburu–Isiolo National Reserve (about 500) and Meru National Park, and occurs in small numbers in Amboseli National Park. Also present in Rhohole, Kor, Marsabit, Shaba, Losai and Arawale National Reserves.

Wildebeest (*Connochaetes taurinus*)

**Distribution & Population:** Widespread in Narok and Kajiado districts in the southwestern grassland zone (Fig. 3). Two distinct subspecies occur, separated by the western flank of the Rift Valley: *C. t. albojubatus* (eastern race) and *C. t. meurans* (western race). Approximately 90–100 000 (slightly over half in Narok) are permanently resident in Kenya. In addition, since 1969 a large proportion of the migratory wildebeest population of the Serengeti-Mara ecosystem has spent the dry season (August–November) in the Masai Mara National Reserve and adjacent areas of southwestern Narok district, returning to Tanzania for the rest of the year. This migratory population increased from 260 000 in the early 1960s to 1.0 to 1.5 million in the late 1970s/early 1980s. The peak wildebeest population of Narok district estimated from KREMU aerial surveys in 1977–83 was 682 000 in October 1980.

**Status:** Satisfactory at present. Dry season ranges are protected within conservation areas, but migration routes and wet season dispersal areas, e.g., on the Athi–Kapiti (Kaputiei) Plains, are increasingly insecure because of the encroachment of settlement and intensification of cattle ranching.

**Conservation Measures Taken:** Occurs in one national reserve and two national parks. Masai Mara National Reserve has a permanently resident population of at least several thousand as well as being a vital dry season concentration area for the migratory herds within the 25 000 sq km Serengeti–Mara ecosystem. Nairobi National Park is a dry season concentration area for the migratory population of about 20 000 in the 2000 sq km Athi-
Kapiti area to the south; the numbers in the national park vary from few to none in some wet seasons to several thousand in the dry season and up to 15,000 during severe droughts, e.g., in 1961, 1973–74, and 1984, when considerable mortality occurred. Similarly, Amboseli National Park is the dry season concentration area for the migratory population of about 8000 wildebeest in the 5000 sq km Amboseli ecosystem.

**Conservation Measures Proposed:** Development of conservation strategies which achieve an acceptable compromise between the requirements of wildlife and the needs of local people will be especially critical to the long-term survival of migratory ungulate populations which spend part of the year outside conservation areas. Considerable progress has been made in this regard in the Amboseli area (Western 1982). In addition, increased international cooperation is required to consolidate the successful efforts by Kenya and Tanzania over the last 25 years to conserve the spectacular wildebeest herds and other wildlife of the Serengeti-Mara ecosystem.

**Hartebeest or Kongoni (Alcelaphus buselaphus)**

**Distribution & Population:** Has lost much of its former range in western Kenya to agricultural development, but remains widespread in southern Kenya (Fig. 3). Coke’s hartebeest (A. b. cokei) occurs in the south, lelwel hartebeest (A. b. lelwel) formerly occurred in the extreme northwest but is now extinct in Kenya, and various hybrids between these two subspecies occurred in the west (Kingdon 1982). These hybrid forms are now confined to Lambwe Valley in the southwest, and Laikipia and adjacent districts. The total population is approximately 40-45,000, with about 20,000 in the southern part of the southwestern grassland zone, 7000 in Laikipia, and 14,000 in the south of the nyika zone. **Status:** Satisfactory. Well represented in conservation areas, although numbers are declining elsewhere because of competition from cattle (Kingdon 1982).

**Conservation Measures Taken:** Occurs in large numbers south of the Galana River in Tsavo National Park (population of the order 8-12,000), and at very high densities in the small Nairobi National Park. The latter park’s resident population of 1-2000 is more than doubled by immigrants from the Athi-Kapiti Plains during severe droughts, when heavy mortality can occur. In 1974, for example, the population in Nairobi National Park was reduced to about 250 by drought, but subsequently recovered. Hartebeest also occur in Masai Mara National Reserve (1-3000), Amboseli National Park (1-200), Hell’s Gate National Park, Lambwe Valley National Park (about 100), Meru National Park (common in the northeast), and Samburu-Isiolo National Reserve (very few).

**Hirola or Hunter’s Hartebeest (Damaliscus hunteri)**

**Distribution & Population:** Confined to southern Garissa and adjacent Lamu district (Fig. 3), where it occurs in a narrow strip of grassy plains lying between waterless thornbush to the north and coastal forest-savanna mosaic to the south (Kingdon 1982), and a small area of Tsavo National Park (introduced). This antelope, which Kingdon suggests is the relic of a formerly more widespread species, occurs only in southeastern Kenya and a small part of adjacent Somalia. Bunderson (1977) estimated a population of 12,500 in Kenya and 1-2000 in Somalia in 1976. Estimates by KREM suggest an average population of about 7000 in Kenya between 1977 and 1983, almost all in Garissa district. Aerial counts by KREM in March 1985 gave a population estimate of only 917 ± 410 hirola in Garissa district, suggesting that the 1984 drought may have reduced the population by more than 80%. **Status:** Vulnerable. Threatened by competition from livestock and development of the cattle industry within its very restricted range (Bunderson 1977; Kingdon 1982). These threats have been compounded by the recent drought.

**Conservation Measures Taken:** Arawac National Reserve is situated in one of this species’ two major concentration areas (Bunderson 1977). Effective protection of the population in this reserve is vital for the hirola’s long-term survival as livestock development schemes inevitably affect the rest of its habitat. A reasonable population has become established in Tsavo National Park, south of the species’ natural range, following its introduction in the 1960s (Grey’s zebra has also been introduced to the same area).

**Topi (Damaliscus lunatus)**

**Distribution & Population:** Occurs in three separate regions (Fig. 3), around Lake Turkana in the north (D. l. tiang), in the southeast (D. l. topi), and in the southwest (D. l. jimela). It still occurs in large numbers in the latter two areas, although it has been eliminated from much of its former range in the southwest by settlement. The total population is estimated to be 110–120,000. This includes approximately 83,000 in Lamu and adjacent parts of Garissa and Tana River districts, 33,000 in Narok district (mainly in Masai Mara National Reserve), and 1500 in the Lake Turkana area. Population estimates in 1985 suggest that the 1984 drought reduced topi numbers in Marsabit and Garissa by 80 to 90%. **Status:** Satisfactory, as long as the conservation areas within which it occurs are maintained.

**Conservation Measures Taken:** Very common in Masai Mara National Reserve, where the population increased from about 4000 in 1960 to 29,000 in 1979. Also occurs in Sibiloi National Park, where Stewart (1963) estimated a population of about 2000 on the grassland strip along the shore of Lake Turkana, Lambwe Valley National Park, and Boni-Dodori and Tana River National Reserves.

**Klipspringer (Oreotragus oreotragus)**

**Distribution & Population:** Widely distributed in suitable habitat, such as the eastern Rift Valley escarpments (Fig. 3). Numbers unknown, but locally common. **Status:** Satisfactory. Sometimes persists close to human settlement.

**Conservation Measures Taken:** Common on rocky hills and lava flows in Tsavo National Park. Present in small to moderate numbers on the moorlands of Aberdare and Mount Kenya National Parks, and in Nairobi, Lake Nakuru, Amboseli and Hell’s Gate National Parks, Masai Mara, Marsabit, Samburu-Isiolo, Lake Bogoria and Losai National Reserves, and Mount Kulal, Mount Nyiru and Ndoto Mountains Forest Reserves.

**Guenther’s Dikdik (Madoqua guentheri)**

**Distribution & Population:** Occurs widely in arid thornbush in the north and east (Fig. 3). It is unclear whether this species occurs south of the Tana River, as indicated by Kingdon’s (1982) distribution map. All of the dikdiks observed during the recent Kora survey were Kirk’s. Population unknown, but common in bushland and thickets throughout much of its range. **Status:** Not threatened.

**Conservation Measures Taken:** Occurs in Sibiloi, Meru, and possibly Tsavo National Parks, and Rahole, Marsabit, Samburu-Isiolo, Shaba, Lake Bogoria, Losai, Arawale and Boni-Dodori National Reserves.

**Kirk’s Dikdik (Madoqua kirkii)**

**Distribution & Population:** Widespread in the southwestern grassland, nyika and coastal zones (Fig. 3). Population unknown, but locally very common. **Status:** Not threatened.

**Conservation Measures Taken:** Occurs in Tsavo, Nairobi, Lake
Nakuru (population more than 150), Meru, Amboseli and Hell's Gate National Parks, and Rahole, Kora, Masai Mara, Samburu-Isoilo, Shaba, Lake Bogoria, Arawale, Tana River and Boni-Dodori National Reserves. Dikdiks are among the most numerous antelopes in many of these parks and reserves, e.g., Meru, Samburu-Isoilo.

Salt's Dikdik (Madoqua saltiana)

Distribution, Population & Status: This dikdik, which is widespread in Somalia and eastern Ethiopia, occurs in the extreme northeast of Kenya in Mandera district (Kingdon 1982) (Fig. 3). There is insufficient information to assess its status in Kenya, but it is common further north.

Oribi (Ourebia ourebi)

Distribution & Population: Has a localised distribution in Kenya and has been eliminated from considerable parts of its former range (Fig. 3). Total numbers unknown, but quite common in some localities. Haggard's oribi (O. o. haggardi) of eastern coastal Kenya and adjacent Somalia is a geographically isolated subspecies which is well differentiated in size and colour from other oribi. Another distinctive subspecies, the Kenya oribi (O. o. keeniae), occurred on the lower slopes of Mount Kenya, where it is probably now extinct.

Status: Satisfactory. Stable populations occur in conservation areas, but many populations in unprotected areas are declining because of poaching and displacement by settlement. Persistent in some less densely settled areas where it occasionally damages cereal crops (Kingdon 1982).

Conservation Measures Taken: Occurs in Masai Mara National Reserve (population about 150), Lambwe Valley National Park (common), and Boni-Dodori National Reserve.

Steenbok (Raphicerus campestris)

Distribution & Population: Widespread in the southwestern grassland and nyika thornbush zones (Fig. 3). Total population unknown.

Status: Satisfactory. Well represented in conservation areas and locally common elsewhere, e.g., in parts of Laikipia district. Appears to benefit from partial clearance of bush for cultivation (Kingdon 1982).

Conservation Measures Taken: Occurs in the upper bamboo and alpine moorland zones of Mount Kenya National Park, and in several other conservation areas, e.g., Tsavo (locally common), Nairobi (few), Lake Nakuru (about 50), and Hell's Gate National Parks, Masai Mara and Tana River National Reserves.

Suni (Neotragus moschatus)

Distribution & Population: Occurs locally in coastal forests and thickets, montane forests and other areas with thick undergrowth (Fig. 3). Numbers unknown. Uncommon in most of its range.

Status: Satisfactory, as long as the conservation areas in which it occurs are maintained.

Conservation Measures Taken: Occurs in Aberdare and Nairobi National Parks, Shimpia Hills and Lake Bogoria National Reserves (common in the latter), and Aberdare-Kinangop and Mount Kenya Forest Reserves.

Impala (Aepyceros melampus)

Distribution & Population: Widespread in the southwestern grassland zone and the southern part of the nyika zone (Fig. 3). The total population is estimated to be about 150,000, including approximately 90,000 in Narok district and 15-20,000 in each of Kajiado and Laikipia districts.

Status: Satisfactory. Common to abundant in conservation areas, and persists in large numbers on ranchland in some regions.

Conservation Measures Taken: Occurs in Tsavo National Park (population > 15,000), Masai Mara National Reserve (20-30,000), Lake Nakuru National Park (several thousand), Amboseli National Park (1000-1500), Samburu-Isoilo National Reserve (1500), Nairobi National Park (700), Meru, Hell's Gate and Lambwe Valley National Parks, Lake Bogoria National Reserve and Mount Kulal Forest Reserve.

Gerenuk (Litocranius walleri)

Distribution & Population: Occurs widely east of the Rift Valley, in substantial numbers in the arid northern and nyika thornbush zones, and in small numbers in the southeast of the southwestern grassland zone (Fig. 3). The total population is estimated to be approximately 40-45,000, with about half in Wajir and Garissa districts; this is probably an underestimate, since Cobb (1976) estimated a population of 28,800 in the Tsavo ecosystem (43,280 sq km) alone. The 1984 drought reduced numbers in northern Kenya by about 60%.

Status: Satisfactory. Well represented in conservation areas, and common over much of the rest of its range, where it has been favoured by bush encroachment resulting from overgrazing by domestic livestock (Simon 1962).

Conservation Measures Taken: Tsavo National Park contains Africa's largest protected population of this species (> 10,000). It also occurs in Sibiloi, Meru (locally common), and Amboseli (few) National Parks, and Samburu-Isoilo (about 500), Shaba (common), Rahole, Kora, Marsabit, Losai and Arawale National Reserves.

Grant's Gazelle (Gazella granti)

Distribution & Population: Formerly occurred throughout most of Kenya, apart from the southwest, central highlands, coastal strip and extreme northeast, remains widespread (Fig. 3). This gazelle is one of the most numerous antelopes in Kenya, with an estimated total population of approximately 270,000. The greatest numbers occur in the arid northern thornbush (195,000), including 30-50,000 in each of Turkana, Marsabit, Isiolo and Wajir districts, and about 15,000 in Garissa. Large numbers also occur in the southwestern grassland zone (60,000, mainly in Narok and Kajiado districts), with about 13,500 in the nyika zone (mainly in Tana River and Taita Taveta districts). The 1984 drought reduced numbers in northern Kenya by 50-60%. Several species of Grant's gazelle have been described; the most distinctive morphologically is Peters' gazelle (G. g. petersi) of the Lower Tana basin.

Status: Satisfactory. Numerous in conservation areas, and remains locally common in northern Kenya despite considerable poaching. It may be favoured by the ecological changes caused by overgrazing (Kingdon 1982).

Conservation Measures Taken: Occurs in Tsavo (population > 10,000), Amboseli (up to 1000-1500), Nairobi (4-500), Lake Nakuru (reintroduced), Sibiloi (about 1000), Meru (common) and Hell's Gate National Parks, and Masai Mara (2-3000), Rahole, Kora, Marsabit, Samburu-Isoilo (500), Shaba (common), Lake Bogoria, Losai (common), and Arawale National Reserves.

Soemmerring's Gazelle (Gazella soemmerringii)

Distribution, Population & Status: Occurs sporadically in north-eastern Kenya near the Ethiopia border (Fig. 3); it is not known whether it is permanently resident in Kenya or moves in occasionally from the north (Kingdon 1982). This gazelle was formerly abundant in the Ethiopian lowlands and Somalia. Its numbers are declining in Ethiopia and it has been reduced to a precarious position in Somalia by overhunting and habitat destruction resulting from overgrazing by domestic livestock. There is insufficient information to assess its status in Kenya, but its future
appears insecure. Even if a permanently resident population could be located, there is little prospect of an effective reserve being established in the remote border areas where it occurs.

Thomson’s Gazelle (Gazella thomsonii)

Distribution & Population: The typical race of this gazelle (G. t. thomsonii, including nasalis) is confined to Kenya and northwestern Tanzania, with another subspecies (G. t. albonotata) occurring in the southeastern Sudan and southwestern Ethiopia. It still occupies much of its former range in Kenya, which included the southern part of the southwestern grassland zone, extending northwards through the Rift Valley to Laikipia and adjacent parts of Samburu district (Fig. 3). The total population is estimated to be approximately 135,000 with the largest numbers (about 110,000) in Narok district.

Status: Satisfactory. Abundant in Masai Mara National Reserve and common in three national parks. Widespread elsewhere, although numbers are gradually declining outside conservation areas.

Conservation Measures Taken: Masai Mara National Reserve contains a resident population of approximately 45,000, which has a separate range from the much larger migratory population of Thomson’s gazelle within the central and southern Serengeti in adjacent Tanzania. Unlike wildebeest and zebra, the migratory gazelle population does not move as far north as the Kenya Mara in the dry season. Thomson’s gazelle also occurs in three national parks: Nairobi (about 350), Lake Nakuru (6,000), and Amboseli (up to 500 in the dry season).

References


**Chapter 9: Tanzania**

W.A. Rodgers & I. Swai

**Introduction**

Tanzania possesses one of the richest wildlife heritages in the world, in terms of both species diversity and large and spectacular antelope populations. Much of the country is thinly populated, and whilst the expansion of human settlement and agricultural development are increasing, there are still extensive tracts of relatively undisturbed wildlife habitat, particularly in the west and south.

Tanzania’s commitment to wildlife conservation is demonstrated by many outstanding achievements for what economically is a poor, developing nation. These include maintaining a well-staffed, relatively effective conservation organisation compared to many African countries, and the establishment of an impressive system of conservation areas. There are 11 national parks, plus the Ngorongoro Conservation Area, 17 game reserves, all of which prohibit settlement and cultivation, plus several game controlled areas and forest reserves, where wildlife and its habitats also receive some protection. This fully protected wildlife area (parks and reserves) totals well over 15% of the country and is still increasing; Mahari Mountains National Park has just been gazetted and the Uzungwa Mountains National Park awaits formal declaration. Tanzania’s determination to conserve its natural resources is also illustrated by the Government’s willingness to endorse the World Conservation Strategy and ratify important international conservation conventions, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

**Current Status of Antelopes**

*Ecological Zones of Tanzania:* Much of Tanzania’s great diversity of wildlife, and especially the antelopes, can be explained by the extraordinary diversity of habitats, varying from sea level to 6000 m and from arid semi-deserts to rain forests. In addition, Tanzania sits at the junction of several major biogeographic regions (see Udvardy 1975, White 1983 and Lamprey 1975). The extensive West African Guinea-Congo tropical forest just reaches western Tanzania, an example of which is Mahari Mountains National Park. The Soudanian savanna woodland covers northwest Tanzania and is typified by Ibanda and Burigi Game Reserves and the Serengeti National Park. The semi-arid Somali-Masai thornbush reaches northeast Tanzania and extends as a tongue into central Tanzania, including for example Tarangire and parts of Ruaha National Park and Mkomazi Game Reserve. The southern and western part of Tanzania is a typical Central African miombo woodland, as in the Selous, Rungwa and Ugalla Game Reserves. The coastal areas are distinctive biogeographically, but are poorly protected. Scattered over this already complex pattern is an archipelago-like zone of Afro-montane forest and Afro-alpine moorland. The mountain national parks, Kilimanjaro, Meru and the proposed Uzungwa park are obvious examples. The extent of these major habitats is shown in Figure 1.

*Distribution of Antelopes in Tanzania:* Antelope species distribution patterns largely follow the broad biogeographical zones described above.

The west African forest zone is represented by some of the easternmost populations of Weyns’ duiker (bongo are not found in Tanzania).

The savanna woodlands have medium grass *Combretum-Terminalia* woodlands in the northwest and shorter grass *Acacia* woodlands in the north. Roan, *topi* and zebra (*Equus burchelli*) are typical of the taller grass areas, and wildebeest, zebra and Thomson’s gazelle dominate on the shorter grass areas.

Antelopes typical of the semi-arid *Acacia-Commiphora* communities include gerenuk, Grant’s gazelle, Kirk’s dikdik, lesser kudu, oryx and steenbok.

The miombo woodlands have extensive populations of greater kudu, Lichtenstein’s hartebeest, roan (not in the east), sable and southern reedbuck. The large areas of flood plain grassland may have large but localised concentrations of bohor reedbuck, buffalo (*Syncerus caffer*), puku and *topi* (e.g., Kilombero, Rukwa and Moyowosi valleys); watet areas in the west harbour sitatunga, e.g., Moyowosi swamps.

The coastal mosaic of forests and *bushland* is an important habitat of bushbuck, *sundi* and red and blue duikers, with Aders’ duiker on Zanzibar Island.

The montane forest habitats have populations of *bushbuck* and Abbott’s, blue and red duikers. Past rumours of bongo on Mount Meru are false (see Kingdon 1982).

One species has become extinct in Tanzania in historical time, the kob, which was formerly present in the forest-grassland mosaic around Lake Victoria, an area now intensively settled.

Tanzania’s varied habitats thus support an antelope fauna of 35 species. Table 1 indicates that 29 of these species’ populations can be considered to have a satisfactory conservation status.

The genetic diversity of Tanzania’s antelope resource is not restricted to these 35 species; many of them exhibit considerable intra-specific variation, and often several subspecies are recognized. Such variation may be distinctive and have definite geographical barriers. The separation of eastern “roosevelti” sable from the southern race by the Nyassa-Usambura mountain chain is one example, the wildebeest of north and southeast Tanzania.


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is another. In some cases the description of very many races, as
in blue duiker, may be due to a poor understanding of population
variation and a scarcity of study material. This report considers
intra-specific variation only in the case of the hartebeest and
wildebeest.

**Conservation Measures Taken**

Tanzania’s national parks and game reserves (Fig. 2) provide
protection for representative examples of most of the country’s
anteelope habitats. Lamprey (1975) provides an analysis of the
conservation status of the varied biomes in East Africa. The
coastal, wet forest and wet grassland areas are not yet represented
in national park status.

The Serengeti National Park and surrounding buffer zone areas
in the *Acacia* savanna zone (Fig. 1) are of major international
importance for anteelope conservation. In addition to the
enormous migratory populations of wildebeest and Thomson’s ga-
zelle, for which the area has been declared a World Heritage Site,
the Serengeti contains large populations of eland. Coke’s harte-
beest, topi and Grant’s gazelle. The adjacent Ngorongoro Con-
|servation Area includes dry plains and thornbush in the southeast
of the Serengeti ecosystem, plus well-watered grassland on the

dloor of the 265 sq km Ngorongoro Crater, and forests and moo-
lands on the highlands surrounding the crater. Tarangire National
Park comprises mainly *Acacia-Commiphora* bushland. It is a dry
season concentration area for the wildlife of the eastern Masai
steppe, with concentrations of wildebeest, zebra, buffalo, eland,
Coke’s hartebeest, impala, gazelles and other species along the
perennial Tarangire River in the dry season; many of these species
migrate out of the national park in the wet season (see Lampey
1964). The relatively small Lake Manyara National Park is pre-
dominantly *Acacia* woodland, and is most notable for its high
biomass of large mammals such as elephant (*Loxodonta africana*)
and buffalo, but impala also occur at a relatively high population
density.

The semi-arid thornbush of northeast Tanzania (Fig. 1) is less
well represented in the national park system, but Mkoomazi Game
Reserve provides protection for its characteristic antelopes, most
of which also occur in Tarangire National Park. Ruaha National
Park and the contiguous Rungwa and Kizigo Game Reserves are
situated on the ecotone of the *Acacia* savanna, thornbush, and
miombo woodland zones. These reserves and the adjacent Mloi-
llambi Game Controlled Area together comprise a large and im-
portant area of wildlife habitat. The abundant antelope fauna of
this area includes species typical of *Acacia* savannas and thorn-
bush and *Commiphora* woodlands, e.g., lesser kudu, Grant’s ga-
zelle and Kirk’s dikdik, species characteristic of miombo, e.g.,
sable, roan and Lichtenstein’s hartebeest, and ubiquitous species
such as eland, waterbuck and impala.

Miombo woodland communities are also protected in the huge
Selous Game Reserve, and several other reserves in western Tan-
zania. The antelope populations of the Selous are second only to
the Serengeti, with tens of thousands of wildebeest and impala
plus zebra concentrated on the short grass areas in the east of the
reserve. Africa’s largest populations of woodland species such as
sable and Lichtenstein’s hartebeest occur in the extensive *Brach-
ystegia-Julbernadia* miombo woodlands. The great size of the
reserve means that there are also large populations of eland, wa-
terbuck and duiker, as well as what may be East Africa’s largest
buffalo, crocodile and hippopotamus (*Hippopotamus amphibius*)
populations (Rodgers 1977).

Katavi National Park is one element in a continuous chain of
tsetse-infested wildlife areas protecting a variety of miombo
woodland, floodplain and swamp communities from Uswa-
Game Reserve on Lake Rukwa in the south to Moyowosi Game
Reserve in the north. There are extensive populations of topi,
sable, roan, and reedbuck, as well as buffalo and zebra in these
areas.

Four reserves are situated in the rolling wooded savannas of
northwest Tanzania: Biharamulo, Burigi (with magnificent scen-
cery around the lake), Rumanyiko Orugundo and Ibunda Arena.
Rubondo Island National Park is a large forested island in Lake
Victoria which has been thought of, perhaps not altogether wisely,
as a refuge for a variety of supposedly endangered species, such
as chimpanzee (Rodgers et al. 1977).

The offshore islands of Mafia, Pemba and Zanzibar have only
recently attracted wildlife conservation interest, despite the
knowledge of the presence of endemic mammal taxa (Moreau &
Pakenham 1941). Pemba, the farthest off-shore, has a more re-
stricted fauna with an endemic subspecies of blue duiker; Zan-
zigbar has the same blue duiker, an endemic subspecies of suni
and a full species, the Aders’ duiker, found only on a small part
of Kenya’s coast and Zanzibar. Mafia shares mainland taxa of
suni and duiker. Swai (1983) discusses large mammal conserva-
tion status on Zanzibar, and strongly suggests the development
of Jozani Forest Reserve and adjacent drier forest areas as a
national park. More details are given below in the section on
individual species.
Table 1
Current Status of Antelopes in Tanzania

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<th>Species</th>
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<td>Common Hartebeest</td>
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<td>Aders' Duiker</td>
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<td>Mountain Reedbuck</td>
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* Ex = extinct; R = rare; V = vulnerable; I = indeterminate (i.e., endangered, vulnerable, or rare); K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.

Poaching is a serious problem in many of the parks and reserves, particularly around their boundaries. While populations of the most commercially valuable wildlife species such as elephant and black rhinoceros (Diceros bicornis) have been reduced severely by poaching in many conservation areas, the level of protection afforded in the national parks has generally been sufficient to maintain healthy antelope populations. Antelopes are poached primarily by local people for meat, rather than by large-scale, organised poaching gangs as in the case of ivory and rhinoceros horn. Nevertheless, poaching of antelopes and other species such as buffalo and zebra to satisfy the demand for game meat in surrounding settlements is becoming increasingly severe in areas such as Arusha National Park, the western and northwestern Serengeti, and northeastern Selous. The relatively abundant antelope populations of areas with high fertility soils, such as the Serengeti, can withstand a much larger offtake through legal/illegal hunting than the low density populations typical of the miombo woodlands, which occur on basement soils of very low nutrient status (Bell 1982), although disturbance problems in the huge herds may exert greater depressive effects than in the smaller group sizes of the woodlands. Most of the major miombo reserves are in sparsely populated areas where poaching pressures on antelope populations were not great until recently, e.g., Selous Game Reserve. Despite its inaccessibility, the Selous has suffered such serious poaching of elephant and rhino in recent years that it has been proposed as one of the world's most endangered protected areas (CNPPA 1986). A 1986 survey showed a possible reduction in numbers of other large mammals, such as Lichtenstein's hartebeest, sable, zebra and eland, especially in the eastern Selous, which may indicate poaching of these species (Douglas-Hamilton 1986). There is no urgent need to introduce effective anti-poaching measures to areas such as the Selous, including provision of adequate staff, equipment, incentives and arms.

In addition to poaching, some of Tanzania's parks and game reserves are threatened by rapid expansion of human settlement and the accompanying increase in such activities as illegal tree-felling, grazing, cultivation and burning, e.g., Arusha National Park, western Serengeti, Uwanda Game Reserve (Rogers 1982), Mkomazi Game Reserve, Maswa Game Reserve, etc. Human settlement and agricultural development are especially severe threats to migratory antelope populations which spend only part of the year within relatively well-protected national parks, e.g., the populations of the Serengeti and Tarangire ecosystems (Makaka et al. 1982; Borner 1985a). In areas of sparse water distribution, a relatively minor increase of settlement pressures on dry season water sources can effectively eliminate extensive wildlife populations, as has been seen in Tabora Region (Ecosystems 1980b).

Many of Tanzania’s evergreen forests are acutely threatened by the expansion of human activities, and only a few forests are within national parks. A substantial proportion (30 sq km) of the montane forest belt on the eastern side of Mount Meru is included in Arusha National Park. Kilimanjaro National Park comprises the upper part of the mountain, above the upper tree limit (2750 m), but also includes six narrow corridors of montane forest which extend to the lower edge of the forest belt (about 1600 m). Although human activities have caused some degradation of these forests they and the less well-protected Kilimanjaro Game Reserve still support significant wildlife populations, including bush-buck, suni, Harvey’s red and Abbott’s duikers. The montane forest (2-300 sq km) included in the new national park in the eastern Uzungwa Mountains, which extends from 300 m to 2650 m, is also an important habitat of Abbott’s duiker and other forest antelopes (Rodgers & Homewood 1982a).

More forest land is under poorly protected forest reserve status where logging, replanting, poaching and even encroachment can occur (e.g., Howell 1981; Rodgers et al. 1980, 1984; Redhead 1981). Even within the national parks, forest and montane habitats may be threatened by such factors as dry season fires started by honey-gatherers or poachers, e.g., Kilimanjaro National Park. In some areas, e.g., the eastern Usambaras, proposed large-scale timber extraction projects would greatly reduce the surviving, fragmented relics of ancient forest ecosystems which contain highly unique assemblages of plants and animals (Rodgers & Homewood 1982b).

Large scale regional surveys (e.g., Ecosystems 1978, 1980a, b) have shown that the great proportion of Tanzania’s wildlife populations are inside protected areas. Even the game controlled areas which rarely control settlement have only low density wildlife resources and it is probable that recent generalised claims for the continued existence of large numbers of animals in non-protected areas, e.g., suni and greater kudu (Kingdon 1982), are no longer true.

Conservation Measures Proposed

Continued financial support from international conservation organisations is essential to maintain Tanzania’s effectiveness in wildlife conservation. Such support is still necessary for regular maintenance activity including improving such aspects as anti-poaching patrols and boundary demarcation in areas threatened by human encroachment (e.g., Makacha et al. 1982). Perhaps more important is the continued need to show Tanzania that the conservation world still values these resources, that Tanzania’s efforts to conserve the resource are appreciated and that the world is prepared to help. Despite the great extent of the existing protected area network, there is still a need for extension of the present system to protect critical wildlife habitats. These extensions could conceivably be part of a land use rationalisation programme involving compromises such as some land of little conservation value being released for development uses.

Examples include the need for new conservation areas adjacent to Tarangire National Park to protect access to vital wet-season habitats and migration routes of antelopes and other wildlife (Berner 1983a), and establishment of better conservation areas adjacent to Katavi National Park and in the Kilombero Valley to protect important floodplain habitats (Rodgers 1982, 1984). An example of land use compromise was the adjustment of the boundary of Selous Game Reserve in 1981 to incorporate important forest relics and releasing a useless area as compensation (Rodgers et al. 1980). More effective conservation of the remaining forests is required urgently throughout East Africa (Struhsaker 1981).

A revised conservation strategy will be even more important than reinforcement and improvement of the existing system of conservation areas, to ensure the long-term survival of Tanzania’s wildlife. Setting aside large tracts of land for wildlife conservation often involves depriving local people of traditional sources of protein and firewood, in some cases without providing adequate alternatives. Kaiza-Boshe (1985) has pointed out that it is essential that a strategy which integrates conservation with national development is devised and implemented. Practical policies must be developed which place greater emphasis on meeting the legitimate needs of local people, by providing them with tangible benefits from wildlife conservation and involving them more directly in conservation decisions. In the absence of such revised conservation strategies, the needs and demands of the expanding human population may result in Tanzania losing most of its rich wildlife resources in the coming thirty years.

To conclude this section it is pertinent to re-examine Table 1. Of five extant taxa considered of non-‘satisfactory’ status, two are insufficiently well known to comment accurately although both are of restricted distribution. Aders’ duiker is considered vulnerable, and must remain so until full protection is given to a viable population on Zanzibar. Weyns’ duiker is rare, but both known populations are in national parks; there is a need for better knowledge of this animal. Mountain reedbuck has widely scattered low density populations, many of them in well-protected parks; status is as high as could be readily achieved.

Species Accounts

East Africa has been a major centre of wildlife research over the last two decades. Much of the published information on aspects such as habitat, feeding, dispersion, seasonal movements, and reproduction of antelope has been reviewed in detail elsewhere, e.g., in an evolutionary context by Kingdon (1982), and is not repeated here. This account summarises distribution, population and conservation status. Readers are cautioned that in many cases data come from surveys undertaken ten years ago or earlier and may no longer be current. Many of the population estimates are approximations only and have wide confidence intervals. Additional information on habitat, food and reproduction is included for the relatively poorly known antelopes of Zanzibar, and the little known endemic Abbott’s duiker.

Information on populations and status of individual species in conservation areas and elsewhere is based on the following sources unless otherwise indicated:


Bushbuck (Tragelaphus scriptus)

Distribution & Population: Occurs widely in riverine, lowland and montane forests, and other wooded habitats with sufficient cover; localised in the semi-arid thornbush zone in the northeast (Fig. 3). Total numbers unknown, but locally common in suitable habitat; exceptionally high density in Rubondo Island National Park.
Status: Satisfactory. May persist even in settled areas where there is sufficient cover and no organised hunting with dogs.

Conservation Measures Taken: Occurs in all the national parks and other conservation areas shown in Fig. 2, except Uwanda Game Reserve. Overall population density is probably high in conservation areas with a substantial proportion of forest habitats, e.g., Arusha National Park, but low within savanna reserves, e.g., estimated bushbuck populations are relatively small in Serengeti National Park (800), Lake Manyara (25), Mkomazi Game Reserve (100) and Selous Game Reserve (500–1000; this figure is undoubtedly an underestimate since it is based on aerial censuses, and bushbuck are difficult to count from the air because they prefer dense cover). Uncommon in Tarangire National Park and does not occur on the floor of Ngorongoro Crater, but is common in the adjacent Ngorongoro forest.

Common Eland (Tragelaphus oryx)

Distribution & Population: Formerly very widespread in savannas and woodlands; still occurs widely, especially in the tsetse-infested southern woodlands (Fig. 3). The total population is probably at least 60–70 000, including 4500 in the Rukwa area, 1800 in Tabora Region, and hitherto unsuspected large populations (10 000) revealed by aerial survey in southern Arusha Region in 1980.

Status: Satisfactory.

Conservation Measures Taken: Occurs in the larger national parks (Serengeti, Ruaha, Mikumi, Tarangire and Katavi), in Arusha and Uzungwa Mountains National Parks, on the moorlands of Kilimanjaro National Park, and in Ngorongoro Conservation Area and all the game reserves. Tanzania’s conservation areas contain some of Africa’s largest remaining eland populations, e.g., 18–20 000 in the Serengeti ecosystem and 5–11 000 in the Selous Game Reserve. There are also substantial populations in Tarangire National Park and the adjacent wet-season dispersal area on the Simanjiro Plains (about 5000), in Ruaha National Park and the contiguous Rungwa-Kizigo Game Reserves (3500), and in Moyowosi (1000+), with smaller populations elsewhere, e.g., Ngorongoro Crater (200–450), Mikumi National Park (200), Mkomazi (500) and Biharamulo-Burigi (500) Game Reserves.

Lesser Kudu (Tragelaphus imberbis)

Distribution & Population: Confined to the semi-arid thornbush zone in northeastern and central Tanzania (Fig. 3), where it still occurs widely at low densities.

Status: Satisfactory.

Conservation Measures Taken: Occurs in Tarangire National Park (population at least 150–300), and Ruaha National Park/Rungwa-Kizigo Game Reserves/Mloa Ilambi Controlled Area, where this species and greater kudu are common in the Acacia bushland and Conmithora woodland of the Rift Valley sector; aerial censuses suggest a combined population of the two species of more than 1000. Lesser kudu also occur in Mkomazi (population about 250)
Fig. 3. Distribution of antelopes in Tanzania—continued.

and an isolated and probably declining population in Maswa Game Reserve.

**Greater Kudu (Tragelaphus strepsiceros)**

*Distribution & Population:* Still occupies a substantial part of its former range in central and southern Tanzania (Fig. 3). Numbers unknown, but locally common in drier areas with sufficient low to medium height woody vegetation to provide browse and cover.  
*Status:* Satisfactory. Well represented in conservation areas, and some may still persist in unprotected habitats which are of little value to man such as rocky hillsides on the Rift Valley escarpments in central Tanzania.  
*Conservation Measures Taken:* Occurs in Ruaha National Park and the adjacent game reserves, where it is locally common and is the predominant kudu species (see above). It is rare in Mikumi, Uzungwa Mountains, Mahari and Katavi National Parks. It is widespread in the Selous (population more than 2000) and commonly seen in Uagalla Game Reserve; it is also found in Maswa and Biharamulo-Burigi Game Reserves.

**Sitatunga (Tragelaphus spekii)**

*Distribution & Population:* Occurs in swamps and swamp margins in scattered localities in western and northwestern Tanzania, including the Moyowosi and Kagera Rivers and the southwestern shores of Lake Victoria. There are a few relic populations in the small swamps of south Uhipa plateau in southwest Tanzania (Fig. 3). Numbers unknown, but common locally in the larger, more inaccessible swamps within which it still occurs.  
*Status:* Not threatened. This species may be more common than generally supposed, and is able to withstand considerable hunting pressure and persist close to human settlement as long as sufficient cover of papyrus and other swamp vegetation remains. Destruction of its habitat, e.g., by repeated burning, and draining of swamps, could threaten its survival in the long term.  
*Conservation Measures Taken:* Occurs naturally in Rubondo Island National Park. Also present in several game reserves, e.g., Biharamulo, Burigi and Moyowosi. The permanent swamps and valley grasslands which comprise about 5% (300 sq km) of Moyowosi Game Reserve contain one of East Africa’s largest protected populations of sitatunga (2000+).

**Aders’ Duiker (Cephalophus adersi)**

*Distribution & Population:* Within Tanzania, this species is known only from Zanzibar Island (Fig. 3), where it is concentrated on the eastern coral rag country; now largely absent from the densely populated west of the island (Fig. 4). The population is about 5000 and declining. It is possible that this species may yet be found on the coast of the Tanzanian mainland north of Dar es Salaam.  
*Habitat, Food & Reproduction:* Prefers the thicket habitat dominant in the coral rag zone. The tree layer is dominated by *Myroxylon aethopicum*, *Diospyros consolatae* and sub-dominant *Euclea schimperi*, and the shrub layer mainly by *Polysperma multiflora* and *Canthium vibricatum*. Aders’ duiker is a browser, selecting for dicotyledonous leaves, seeds and fruits. Occurs singly, in pairs or threes; territorial. Births occur throughout the year.  
*Status:* Threatened by habitat destruction, including uncontrolled
harvesting of forest products for firewood, building poles and charcoal, plus shifting cultivation which is increasingly fragmenting this duiker's habitat, and by overutilisation. Aders' duiker is regularly hunted by local people for meat and recreation. Conservation Measures Taken: Fully protected by law, but very little enforcement. Four forest reserves (Jozani, Dunga-Lendelele, Masingini and Kichwele) exist, but there are no areas on Zanzibar Island set aside specifically for wildlife conservation.

Conservation Measures Proposed: A national park has been proposed (Swai 1983) comprising Jozani Forest Reserve and the surrounding thickets including Mapopwe Forest as its buffer zone. There is also a need to establish a Wildlife Section under the Forestry Department, review existing wildlife legislation, improve law enforcement, control the fragmentation of natural habitats, and educate local people about the practical value of and need for wildlife conservation.

**Blue Duiker (Cephalophus monticola)**

Distribution & Population: Occurs locally in montane and lowland evergreen forests and dense coastal scrub within its overall range (Fig. 3); e.g., in the Lake Victoria area in the northwest, the Usambara, Uluguru, Uzungwa and Ulipa Mountains, southern highlands, eastern coast, Zanzibar and Pemba Islands. Widespread on Zanzibar Island, occurring at high densities (5 per sq km) on the eastern coral rag country and lower densities (0 to 1.3 per sq km) in other habitats (Fig. 4). On Pemba, blue duiker occur in the Kiuwyo thickets in the extreme northeast of the island (J. Swai, personal observation). Total population unknown, but locally common. The population on Zanzibar is about 10,000 and is probably decreasing because of uncontrolled hunting and habitat destruction.

Habitat, Food & Reproduction: Habitat preference similar to Aders' duiker on Zanzibar. Blue duiker browse on leaves, seeds and fruits of shrubs and trees. Occurs singly or in pairs; territorial. Reproduces throughout the year.

Status: Hunted widely by snaring and netting for meat and hides, but able to withstand considerable hunting pressure and not threatened.

Conservation Measures Taken: Occurs in proposed Uzungwa Mountains National Park. Also present in denser vegetation of a few other protected areas, where it is generally rare and localised, e.g., Serengeti National Park, Selous Game Reserve. Occurs in Jozani and other forest reserves on Zanzibar Island, but these reserves were not instituted for wildlife conservation. Two-thirds of Jozani is groundwater forest which is too wet for bovids, but blue duiker, Aders' duiker and suni occur in the coral rag thickets which dominate the other one-third of Jozani and adjacent areas, including Mapopwe Forest. The conservation measures proposed for Aders' duiker on Zanzibar would also benefit this species (Swai 1983). Comments on the status of Abbott's duiker will also apply to blue duiker in mountain habitats.

**Harvey's Red Duiker (Cephalophus harveyi) and Natal Red Duiker (C. natalensis)**

Distribution & Population: These red duikers, which are often treated as allopatric races of one species, occur widely in lowland and montane evergreen forests, coastal scrub, thickets and other habitats with thick cover, within overall ranges in eastern and
young shoots, fruits and flowers. Probably sedentary. Almost nothing is known about its biology, but the moist habitats in which it occurs probably preclude marked seasonality, e.g., in reproduction.

**Status:** Its surviving populations are unlikely to be large and are threatened by habitat destruction and hunting. It is fully protected in law, so trade in the species is banned. Much of its habitat, e.g., on Kilimanjaro, the Usambara and Uluguru Mountains, and Mount Rungwe is in poorly protected game and forest reserves, where encroachment of human settlement and logging occur. It is hunted with nets, traps and dogs throughout its range by people from peripheral villages, and legal and illegal logging camps deep in the forest.

**Conservation Measures Taken:** Some of its habitat is protected in the forest corridors of Kilimanjaro National Park and it also occurs in the adjacent game reserve; Kingdon (1982) records this duiker as still fairly common in forest and high altitude swamps on Kilimanjaro. The proposed Uzungwa Mountains National Park will represent a major step forward in the conservation of this species. The proposed park contains a large portion of its habitat (about 2-300 sq km of forest) in this area, where its droppings and tracks were observed to be common in August 1985. Nevertheless, most of its populations will still occur outside national parks, mainly in forest reserves. There is a need for a greater awareness of this species among Tanzania’s conservationists and managers of forest and game reserves. Effective conservation of a specific animal in logged forests cannot take place in ignorance.

**Weyns’ Duiker (Cephalophus weynsi)**

**Distribution & Population:** This duiker, sometimes regarded as the eastern subspecies of Peters’ duiker (C. callipygus weynsi), was formerly thought to be a western population of Abbott’s duiker (Kingdon 1982). It occurs in forests along the eastern shore of Lake Tanganyika (Fig. 3). Population unknown, but not large.

**Status:** Rare.

**Conservation Measures Taken:** Has been recorded in Gombe Stream and Mahari Mountains National Parks.

**Grey Duiker (Cephalophus grimmia)**

**Distribution & Population:** Occurs almost throughout Tanzania (Fig. 3), in a wide variety of habitats with sufficient cover to provide shelter; from coastal scrub to subalpine moorlands above the treeline (e.g., on Kilimanjaro); absent from thick forest. Population unknown, but locally common.

**Status:** Satisfactory. Can persist in settled areas.

**Conservation Measures Taken:** Present in all of the national parks, except Rubondo Island and Tarangire and possibly Gombe Stream, and in most game reserves, generally in low to moderate numbers, e.g., 2500 in Serengeti National Park, a minimum of 5000 in Selous Game Reserve, where it may reach densities of 4 per sq km in favoured localities.

**Waterbuck (Kobus ellipsiprymnus)**

**Distribution & Population:** Occurs in savanna grasslands and valley grassland close to permanent water, particularly in Brachystegia woodland (Fig. 3). Two distinct subspecies occur, K. e. ellipsiprymnus on the eastern side and K. e. defassa on the western side of the Rift Valley wall. The total population probably exceeds 25,000, including 4400 in the Rukwa area and 1000 in Tabora Region.

**Status:** Not threatened, although it has been eliminated from a considerable part of its former range by human settlement and hunting.

**Conservation Measures Taken:** Occurs in all of the national parks except Kilimanjaro and Rubondo Island and in most of the game
reserves. The largest protected population is in Selous Game Reserve (5–12,000), with about 5000 in Moyowosi Game Reserve and 3000 in Serengeti National Park. Numbers are generally smaller in other conservation areas, e.g., 50–120 in Ngorongoro Crater, 150 in Mkomazi Game Reserve, 15 in Lake Manyara National Park.

**Kob (Kobus kob thomasi)**

*Distribution, Population & Status:* This species has been eliminated from its former range in savanna grasslands alongside Lake Victoria (Fig. 3) by hunting and the spread of settlement and agricultural development. It is now extinct in Tanzania.

**Puku (Kobus vardoni)**

*Distribution & Population:* Confined to floodplain grasslands in the Lake Rukwa and Kilombero Valleys; formerly occurred at the northern end of Lake Malawi but now extinct there (Fig. 3). This species' distribution and numbers have been described by Rodgers (1984). A prolonged rise in the level of Lake Rukwa since the mid-1960s has flooded much of the puku's preferred habitat (Rodgers 1982). By 1977, the population of about 5000 in the North Rukwa Game Controlled Area at the northern end of the lake had apparently been eliminated, and the similar-sized population in Uwanda Game Reserve on the southern shore reduced to about 1400. The major surviving population is in the 8000 sq km Kilombero Valley, where the population was estimated to be approximately 26,500 in 1976 and 43,600 in 1986.

*Status:* This species is not in any immediate danger in Tanzania, but its long-term survival is threatened by the effects of flooding in the Rukwa Valley and insufficient protection of its habitat in the Kilombero Valley.

*Conservation Measures Taken:* Occurs in Uwanda Game Reserve, where it has been affected adversely by flooding, poaching and expanding settlement. The puku's range along the Kilombero River extends for a few kilometres into the Selous Game Reserve, but the population within this reserve is only about 120.

*Conservation Measures Proposed:* A game reserve has been suggested for the uninhabited parts of the Kilombero Valley to protect large populations of puku, buffalo and other species of wildlife (Rodgers 1984). Effective conservation of this population is essential for the puku's long-term survival in Tanzania.

**Southern Reedbuck (Redunca arundinum)**

*Distribution & Population:* Widespread at low population densities in the miombo woodlands of the south and west (Fig. 3). This species occurs mainly in small groups on grassy valleys and open glades within the woodlands, and tends to be replaced by the bohor reedbuck on larger areas of open floodplain grassland. The total population is unknown but probably exceeds 20,000.

*Status:* Satisfactory.

*Conservation Measures Taken:* Occurs in Ruaha National Park (uncommon), and several game reserves including Selous, Rungwa-Kizigo, Ugalia, Moyowosi and Biharamulo-Burigi.

**Bohor Reebuck (Redunca redunca)**

*Distribution & Population:* Distributed patchily in savanna and floodplain grasslands throughout Tanzania (Fig. 3), reaching the southern limit of its continental distribution on the Ruwuma River in the southeast, where its distribution overlaps that of the southern reedbuck. The bohor reebuck is the dominant species in the more extensive floodplains, reedbeds, and other large, open, seasonally inundated grasslands. Total population unknown but probably at least 7,500–10,000.

*Status:* Satisfactory.

*Conservation Measures Taken:* Occurs in most of the national parks, viz., Serengeti, Ruaha, Mikumi, Tarangire, Katavi, Lake Manyara and Arusha, and in Ngorongoro Conservation Area and many of the game reserves, e.g., Selous, Ugalia, Mkomazi, Uwanda, Biharamulo-Burigi, Moyowosi, Rumanikya Orugundu, Ibanda Arona. Protected populations are generally small to moderate, e.g., Serengeti (1700), Selous (1000+), Biharamulo (745). Lake Manyara (40), Ngorongoro Crater (60), and Mkomazi (50). Formerly common in Uwanda Game Reserve and adjacent areas, but like other floodplain species in the Lake Rukwa Valley its numbers have been reduced markedly by flooding and the spread of settlement and cultivation.

**Mountain Reebuck (Redunca fulvorufa)**

*Distribution & Population:* Confined to isolated areas of higher altitude grasslands (mainly above 1500 m) in the north (Fig. 3), where it occurs in small numbers.

*Status:* Rare. Unprotected populations, e.g., in the Haang, Mbulu, Lolkisale and Loliondo Mountains, are highly endangered or extinct.

*Conservation Measures Taken:* Occurs on rocky and grass-covered hillsides in Serengeti and Arusha National Parks and Ngorongoro Conservation Area, and on the moorlands above the tree line in Kilimanjaro National Park. These protected populations may be more extensive than previously believed, e.g., 20–50 on the interior walls of Ngorongoro Crater (Irby 1977), probably similar numbers around Empakaai Crater (Frame 1982), and a lower density on the extensive montane grassland in between (W.A. Rodgers, personal observations).

**Roan (Hippotragus equinus)**

*Distribution & Population:* Remains widespread in the tsetse-infested miombo Brachystegia woodlands of western Tanzania, and occurs in scattered localities in the north and northwest. It is absent from eastern Tanzania (Fig. 3). Occurs at low population densities, rarely exceeding 1 per sq km, and the total population probably does not exceed 10,000. Aerial survey showed populations of 3700 in the Rukwa area and 5000 in Tabora Region.

*Status:* Satisfactory. Occurs in moderate numbers in conservation areas within its range, but threatened to some degree outside conservation areas by the spread of human settlement into previously uninhabited areas.

*Conservation Measures Taken:* Census in the Ruaha National Park area in 1977 revealed a population of at least 1200, with 25% in the park, 25% in Rungwa-Kizigo Game Reserves, and 50% in the adjacent Mloa-Ilambo Game Controlled Area. Roan also occur in Serengeti (population 1–300), Katavi, Mahali and Tarangire (very few) National Parks, and have been introduced into Rubondo Island National Park (16 released in the 1968). Also present in several game reserves, e.g., Ugalia, Moyowosi (500), Biharamulo-Burigi (430), Rumanikya Orugundu, and Ibanda Arona.

**Sable (Hippotragus niger)**

*Distribution & Population:* Now has been largely eliminated from its former range in northeastern Tanzania, but H. n. kirki still occurs widely in the tsetse-infested miombo woodlands of the west and south (Fig. 3). The total population may be of the order 30–40,000, including an estimated 5000 in Tabora Region and 10,000 in the Rukwa area, with 1000 in the Kilombero Valley.

*Status:* Satisfactory. Well represented in conservation areas within its range, although populations are probably declining elsewhere because of hunting and the encroachment of settlement.

*Conservation Measures Taken:* The population of approximately 5–10,000 in the vast Selous Game Reserve is probably the largest protected population of this species in Africa, although it may have been reduced by poaching over the last decade (numbers in the Selous were estimated to be 9700 in 1976 and 4400 in 1986).
Rungwa-Kizigo Game Reserves also contain a major sable population (4800), with smaller numbers in the contiguous Ruaha National Park (500) and Mloa-Iambi Game Controlled Area (200). Sable also occur in Mikumi (510-1000), Mahali, Uzungwa Mountains and Katavi National Parks, Ugalla, Moyowosi (1000+) and Biharamulo (150) Game Reserves.

Fringe-eared Oryx (Oryx gazella callovis)

Distribution & Population: Confined to the semi-arid thornbush zone of the northeast, extending west to the dry grasslands of the Serengeti Plain (Fig. 3). Total numbers may be in the order of 6900 (Ecosystems 1980a).

Status: Not threatened, as long as effective protection of the populations occurring within conservation areas is maintained.

Conservation Measures Taken: There is a population of about 1000 oryx in the Tarangire National Park-Loliondo-Simanjiro Plains area, with smaller numbers in Mkomazi Game Reserve (1-400) and on the short-grass plains in the southeast of the Serengeti ecosystem (400; mainly to the southeast of the national park, in the Ngorongoro Conservation Area).

Wildebeest (Connochaetes taurinus)

Distribution & Population: Occurs in three separate areas, the eastern white-bearded race (C. t. albojubatus) in eastern Masailand to the western wall of the Gregory Rift Valley; the western white-bearded wildebeest (C. t. meauresi) in western Masailand; and the Nyassa or Johnston's wildebeest (C. t. johnstonii) in the south (Fig. 3). The latter subspecies is now endangered or extinct in Mozambique and Malawi, but is still common in southern Tanzania.

The migratory wildebeest population of the Serengeti ecosystem in the northwest is Africa's largest extant, discrete antelope population, rivalled only by the white-eared kob of the Boma ecosystem in the southeastern Sudan. The Serengeti wildebeest population increased from 260,000 in 1961 to about 1.3 million in 1977, following its release from disease (rinderpest) in the 1960s, and an increase in its food supply in 1970s resulting from a change in the seasonal rainfall pattern towards greater dry season rainfall. Since 1977 the population has stabilised at between 1.0 and 1.5 million due to intraspecific competition for food (Sinclair & Norton-Griffiths 1982; Sinclair et al. 1985).

The Serengeti wildebeest spend the wet season (December-April) on the short-grass plains in the southeast of the ecosystem, migrating to the western woodlands and medium-grass plains in May-July, and to the northern woodlands in the dry season (August-November). Since 1969 the wildebeest's dry season range has extended increasingly northwards across the Kenya border to the Masai Mara Game Reserve. In addition to the huge migratory population, there are several resident populations each numbering 10-15,000 animals: in the Western Corridor Serengeti N.P.; in the Loliondo Controlled Hunting Area; and in Ngorongoro Crater (10-30% of which migrate out of the crater in the wet season).

The largest remaining populations of the eastern white-bearded wildebeest in Tanzania occur in the Rift Valley and adjacent parts of East Masailand, of which some 24,000 head concentrate in Tarangire National Park during the dry season and migrate east to the Simanjiro Plains in the wet season. Another dry-season concentration area is the plains around Lake Manyara. In addition, some hundreds of wildebeest from the Amboseli population congregate in the Rift Valley between Lakes Natron and Magadi.

Johnston's wildebeest is represented by 65-70,000 animals in the east of the Selous Game Reserve and 12,500 in Mikumi National Park. The country's total wildebeest population of about 1.5 million represents over 80% of Africa's population of this species.

Status: Satisfactory. Expanding human settlement and poaching in areas outside the relatively well-protected national parks are long-term threats to the migratory herds. The return of rinderpest is also a potential threat to the present high population levels, which may decrease with a drier rainfall cycle (Rossiter 1984).

Conservation Measures Taken: Serengeti National Park and the adjacent Ngorongoro Conservation Area and Maswa Game Reserve, Tarangire National Park (dry season only), and Selous Game Reserve protect the major populations. A population of about 700 wildebeest occurred on the open grassland of the lake-side flats in Lake Manyara National Park prior to 1962, but subsequently disappeared when the level of the lake rose and the flats were flooded. Wildebeest have since reappeared in this national park, a fall in the lake level having restored the flats, and over 300 were present in 1987. The future of this population (and probably Lake Manyara National Park's zebra population, which declined to low levels but did not die out completely during the 1960s) depends on the maintenance of a migration corridor to the plains to the north and east, through an area where human settlement is expanding rapidly.

Additional Remarks: The migratory wildebeest population of the Serengeti is one of the world's great wildlife spectacles and an outstanding example of adaptation by a large mammal to seasonal fluctuations in its environment. This population is also a valuable natural resource, with major potential in such areas as revenue-earning through tourism. The effective conservation of the Serengeti ecosystem over the last two decades represents an outstanding achievement by Tanzania's conservationists. Continued support of Tanzania's efforts to conserve the Serengeti must assume a high priority in international wildlife conservation programs.

Coke's Hartebeest (Alcelaphus buseilaphus cokes)

Distribution & Population: Formerly widespread in the Acacia savannas and thornbush of northern Tanzania; but range now reduced due to settlement increase. The anomalous record of this species in southern Tanzania (E.A. Wildlife Society 1977) is a printing error. The southern-most population is in Sadani on the coast. The total population of Cooke's hartebeest in Tanzania exceeds 25,000, including 15,000 estimated for all of Arusha region.

Status: Satisfactory. Well represented in conservation areas, although numbers are declining elsewhere.

Conservation Measures Taken: Common in the northern and central woodlands of Serengeti National Park and the adjacent game reserves (population 10-20,000), and in Tarangire National Park (about 1000 resident; a further 5500 spend the wet season on the Loliondo and Simanjiro Plains to the east and migrate into the park in the dry season) and Mkomazi Game Reserve, where Afolayan (1976) estimated a population of 2000. A small population of about 150 occurs in Ngorongoro Crater.

Ilewel Hartebeest (Alcelaphus buseilaphus lewel)

Distribution & Population: This hartebeest, which is common in the southern Sudan and northern Uganda, reaches its southern limit in northwestern Tanzania (Fig. 3), where it occurs in small numbers.

Status: Vulnerable.

Conservation Measures Taken: Occurs in Rumanyika Orungu and Ibadan Area Game Reserves. However, inadequate conservation inputs in these remote areas mean that the subspecies' status in Tanzania remains insecure.

Lichtenstein's Hartebeest (Alcelaphus lichtensteinii)

Distribution & Population: This species, sometimes regarded as a race of A. buseilaphus, is characteristic of Brachystegia woodland, within which it remains widespread in southern and western Tan-
zanja (Fig. 3). The total population may be of the order 50–75 000 or more, including an estimated 13 000 in the Rukwa area, with 1000 in the Kilombero Valley, and 3200 in Tabora Region. Status: Satisfactory. Well represented in conservation areas, and although retreating before the advancement of human settlement and unable to withstand heavy hunting pressure, it persists in extensive areas of tsetse-infested miombo.

Conservation Measures Taken: The major protected population of this species throughout its range in southern and eastern Africa is in Tanzania’s Selous Game Reserve, where it was estimated to number 35 000 in 1976 but substantially less (15 000) in 1986. This decline may have been caused by poisoning for meat, and is of serious concern in view of the importance of the Selous population and this species’ rapid decline in the face of uncontrolled hunting elsewhere in its range, e.g., in Mozambique. Lichtenstein’s hartebeest is also common in Rungwa-Kizigo Game Reserves (population 2300), with smaller numbers (250) in the Brachystegia woodland sector of the adjacent Ruaha National Park. It also occurs in Mikumi (150), Mahari and Katavi National Parks, and Ugalia, Moyowosoi (3000), and Biharamulo-Burigi (400) Game Reserves.

Topi (Damaliscus lunatus jimela)

Distribution & Population: Formerly widespread in western Tanzania on seasonally inundated grasslands within Acacia and Combretum savannas, and Brachystegia woodlands. The species has lost about half of its former range to increasing settlement (Fig. 3), mainly near Lake Victoria. Total numbers probably exceed 70 000, with an estimated 4500 in the Rukwa area and 3500 in Tabora Region.

The topi population on the Lake Rukwa Valley floodplains fluctuates with the cyclical variation in lake levels (Rodgers 1982). During the 1950s and 1960s, when lake levels were low to medium, the Lake Rukwa topi population increased steadily to reach peak levels of about 13 000 (North Rukwa) and 9000 (Uwanda Game Reserve area) in 1968. Since then, the level of Lake Rukwa has remained high, flooding the topi’s habitat; numbers had declined to 750 (North Rukwa) and 1000 (Uwanda) by 1977 (Rodgers 1984).

Status: Satisfactory. Large, stable or increasing populations occur in some conservation areas, but in other areas its populations have declined, e.g., Lake Rukwa.

Conservation Measures Taken: Serengeti National Park is of major importance for the conservation of this species, with a large population in the western corridor and northern and central savannas. This population increased from about 30 000 in the 1960s to 55 000 in the late 1970s, apparently because of expansion of the park boundary and improved control of poaching by the park authorities as well as wetter dry seasons. There is a smaller population in Katavi National Park (about 1000), and topi also occur in Ugalia, Maswa, Moyowosoi (6000), Uwanda, Biharamulo Burigi (2800), and Rumaninya Orungu Game Reserves.

Conservation Measures Proposed: The future of the Lake Rukwa topi population is insecure. The combined effects of flooding and rapidly encroaching human settlement threaten Uwanda Game Reserve. The North Rukwa topi population remains in contact with the topi populations of the Katavi and Lake Chala floodplains to the north and may therefore be able to recover when Lake Rukwa again recedes, but there is a need to incorporate the North Rukwa Plains into a game reserve or an extension of Katavi National Park (Rodgers 1982).

Klipspringer (Oreotragus oreotragus)

Distribution & Population: Occurs on rocky outcrops, hillsides, lava flows, open scree, and escarpments in scattered localities throughout, especially in the Rift Valley area in central Tanzania (Fig. 3). Numbers unknown, but locally common within its preferred habitat.

Status: Satisfactory. Its habitat is of little value to man, and it may survive on rocky outcrops in settled areas after cultivation and hunting have eliminated most other antelopes.

Conservation Measures Taken: Occurs in several national parks, e.g., Serengti (population about 500), Ruaha, Kilimanjaro (occurs up to 4000 m), Lake Manyara (small numbers on the escarpment), Uzungwa Mountains and Arusha (Kingdon 1982 states that it is common on the summit of Mount Meru and on the ash cone within its crater). Also occurs in Ngorongoro Conservation Area and in most of the game reserves.

Kirk’s Dikdik (Madoqua kirkii)

Distribution & Population: Occurs widely in semi-arid thicket and bush country in northern and central Tanzania (Fig. 3). Locally common; the total population probably numbers at least one hundred thousand.

Status: Satisfactory. Hunted widely, but can persist in areas close to human settlement.

Conservation Measures Taken: Common in Serengeti (population 32 000), Tarangire (population about 5000), and Arusha National Parks. Also occurs in Ruaha, Katavi and Lake Manyara National Parks, and in Ngorongoro Conservation Area and several game reserves, e.g., Rungwa-Kizigo, Ugalia, Mkomaizi and Maswa.

Oribi (Ourebia ourebi)

Distribution & Population: Occurs mainly in the Lake Victoria region, where it has been eliminated from much of its former range by hunting and settlement, the northwestern Acacia savannas, and in parts of the western and southern Brachystegia woodlands (Fig. 3). Numbers unknown.

Status: Satisfactory. Does not persist in the face of dense human settlement, but well represented in conservation areas.

Conservation Measures Taken: Occurs in Serengeti (population about 3000), Ruaha, Katavi and Lake Manyara (very few) National Parks, Ngorongoro Conservation Area (absent from the crater), and in several game reserves, e.g., Selous (a small and restricted population of a southeastern subspecies), Rungwa-Kizigo, Ugalia, Moyowosoi, Biharamulo (230), Burigi, and Rumaninya Orungu.

Steenbok (Raphicerus campestris)

Distribution & Population: Widely distributed in the Acacia savanna, thornbush and highland grasslands of northern and central Tanzania (Fig. 3). Numbers unknown.

Status: Satisfactory.

Conservation Measures Taken: Occurs in several conservation areas, e.g., Serengeti (population 2500), Tarangire (about 150) and Lake Manyara (small numbers) National Parks, and Mkomaizi Game Reserve (locally common). In Ngorongoro Conservation Area they are commonly seen in the crater highlands.

Sharpe’s Gryshok (Raphicerus sharpei)

Distribution & Population: Little is known about this species, which has been recorded from scattered parts of the Brachystegia woodland zone in the south and west (Fig. 3), mainly in areas with low thicket or secondary growth. It may occur more widely within this vegetation zone. Numbers unknown.

Status: There is insufficient information to assess this species’ status. Although not often seen, it is largely nocturnal, spending the day in thick cover, and may be more common than generally supposed. It is vulnerable to hunting with dogs.

Conservation Measures Taken: Occurs in Selous (where it appears to be restricted to the south) and Ugalia Game Reserves.
Suni (Neotragus moschatus)

Distribution & Population: Occurs in coastal forests and thickets, montane forests and other areas with thick undergrowth, in the eastern half of the country (Fig. 3). It is widespread on Zanzibar Island, occurring at high densities in the eastern coastal rag country and at low densities in the densely populated west (Fig. 4). The population of Zanzibar is at least 20,000; the population on the mainland is unknown but it may be over one hundred thousand. Habitat, Food & Reproduction: Occupies similar thicket habitat to blue and Aders’ duikers on Zanzibar (see above). A browser, it also feeds opportunistically on fallen fruits, associating with Sykes’ monkeys (Cercopithecus mitis albogularis) and red colobus (Colobus badius kirkii) for this purpose on Zanzibar. Occurs singly, in pairs or threes; territorial. Births occur throughout the year.

Status: Satisfactory. Although hunted widely with dogs, nets and snares, suni remain widespread in coastal thickets and forests on both the mainland (Kingdon 1982) and Zanzibar Island (Swai 1983). Conservation Measures Taken: Occurs in montane forests in Arusha and proposed Uzungwa Mountains National Parks, the forest corridors of Kilimanjaro National Park, and Kilimanjaro Game Reserve. Also occurs in Lake Manyara National Park and Selous Game Reserve, and introduced to Rubondo Island National Park. On Zanzibar Island, there is a 6-month hunting season for suni; it occurs in Jozani and other forest reserves but these are not managed for wildlife conservation. The proposed conservation measures mentioned above for Aders’ duiker on Zanzibar would also benefit suni.

Impala (Aepyceros melampus)

Distribution & Population: Formerly widespread in the Acacia savanna and thornbush zones and in areas of Acacia and other deciduous woodlands and bushlands within the miombo-Combretum woodland zone; still occupies a considerable part of its former range (Fig. 3). Numbers probably exceed 300,000.

Status: Satisfactory. Common in many conservation areas, and numerous on some cattle ranches where it has been cropped for meat and hides in the past (Kingdon 1982).

Conservation Measures Taken: Abundant in the woodlands of Serengeti National Park, where the population increased from 60–80,000 in the 1960s to about 120,000 in the late 1970s; most of this increase occurred in the western Serengeti where effective law enforcement reduced the level of human hunting. Large populations also occur in Ruaha National Park (9–13,000), Tarangire National Park (6,000 resident in the park, with a further 24,000 to the east of the park in Loliondo-Simanjiro), and Selous Game Reserve (20–50,000). Impala also occur in Lake Manyara National Park, where the population was reduced from 1600 to 500 by an outbreak of anthrax in 1984 (Boshe and Malima 1986). Mikumi (1600) and Arusha National Parks, Ngorongoro Conservation Area (not within the crater), and Runega-Kizigo (population 12,000), Uluguru (which has the largest population of Tabora Region’s estimated 3000), Mkouazi (population 600), Maswa, Biharamulo Burigi (500), and Ibanda Arena Game Reserves.

Gerenak (Litocranius walleri)

Distribution & Population: Confined to the northeastern thornbush, where it is still widespread (Fig. 3). Numbers unknown, but not uncommon in some localities. An aerial survey of Arusha Region estimated 1000 animals (Ecosystems 1980a), which is a gross underestimate due to poor visibility of this species from the air.

Status: Satisfactory. Although it occurs in only a few conservation areas in Tanzania, it may have been favoured to some extent in unprotected areas by the expansion of bush vegetation on range-lands overgrazed by domestic stock.

Conservation Measures Taken: Occurs in Mkomazi Game Reserve (population 250). Present in small numbers on the Simanjiro Plains to the east of Tarangire National Park and may occur within this park.

Grant’s Gazelle (Gazella granti)

Distribution & Population: Widespread in the Acacia savanna and thornbush zones (Fig. 3). The total population may exceed 75,000, including an estimated 12,000 in Arusha Region outside Ngorongoro Conservation Area.

Status: Satisfactory. Common in several conservation areas and persists in low to moderate numbers elsewhere within its range. It may benefit from the ecological changes which result from overgrazing by domestic stock.

Conservation Measures Taken: Serengeti National Park, the adjacent game reserves and Ngorongoro Conservation Area contain the largest protected population of this gazelle; its numbers in the Serengeti ecosystem increased from 30,000 in 1967 to 52,000 in 1978. A separate population of about 1500 Grant’s gazelle occurs in Ngorongoro Crater. Also occurs in Ruaha (rare) and Tarangire (population 900) National Parks, and Runega-Kizigo and Mkomazi (population 150–600) Game Reserves.

Thomson’s Gazelle (Gazella thomsonii)

Distribution & Population: The nominate subspecies (G. t. thomsonii, including nasalis) occurs in Acacia savannas and grasslands in the north (Fig. 3). Numbers exceed 0.5 million, with the major population in the Serengeti. There are an estimated 20,000 in Arusha Region outside Ngorongoro Conservation Area. There is a southern population of some 1000 animals in the northeast of Tabora Region on the Wembere Plain.

Status: Satisfactory. Locally abundant within conservation areas, and often persists on cattle ranches although Kingdon (1982) noted that its numbers are declining in many areas.

Conservation Measures Taken: The migratory population of this species in Serengeti National Park and surrounding conservation areas is Africa’s largest and most spectacular protected gazelle population. The population of the Serengeti ecosystem may have declined from 656,000 in 1972 to about 300,000 in 1980 because of competition for food with increased numbers of wildebeest (Sinclair & Norton-Griffiths 1982). The migratory Thomson’s gazelle remain on the open plains in the southeast of the ecosystem (wet season range) for longer than the wildebeest, and do not migrate as far into the northern woodlands in the dry season. There are smaller resident populations of this gazelle in the western Serengeti (10,000) and Ngorongoro Crater (3500). It also occurs in Tarangire National Park, where the resident, wet-season population of 600 is augmented in the dry season by a migratory population of 3000 which spends the wet season on the Simanjiro Plains.

References


Chapter 10: Rwanda

Nicole Monfort

Introduction

Situated between the western branch of the Rift Valley and the Nile basin, Rwanda is a highland country largely above 1500 m in altitude. It is one of the smallest and most densely populated countries in Africa, with over 6 million people in an area of 26,340 sq km (more than 230 per sq km; local densities exceed 400 per sq km). Mean annual rainfall is greater than 2000 mm in parts of the mountainous west and between 700 and 1000 mm in the east.

The western one-third of the country is dominated by the mountains which form the divide between the Zaire and Nile watersheds, and was originally covered by montane and submontane forest. The eastern two-thirds contained high grassland plateaus, moist Acacia-Combretum savannas, and forest-savanna mosaics, with extensive swamp systems in the southeast. Intensive settlement, agricultural development and cattle grazing have displaced or degraded almost all of the natural vegetation outside conservation areas (Fig. 1), but these comprise approximately 15% of Rwanda’s total area (a larger percentage than in most other African countries).

Current Status of Antelopes

Most antelopes and other large wild animals are now confined to the national parks and forest reserves. Rwanda is not known to have lost any antelope species in historical times (with the possible exception of the yellow-backed duiker, which may have become extinct recently). The overall status of antelopes (Table 1) is reasonably good, considering the very high human population density. Most of the savanna species are well represented in Akagera National Park. The reduction of Rwanda’s forests to a few isolated fragments within the Volcanoes National Park and the forest reserves (Fig. 1) is reflected by the status of the forest duikers (Table 1).

Conservation Measures Taken

The survival in Rwanda of savanna antelopes and other large savanna mammals such as zebra (Equus burchelli) and buffalo (Syncerus caffer) is dependent on the continued maintenance of Akagera National Park. This national park was established in 1934 and is among the most spectacular reserves in East Africa (Monfort & Monfort 1982). The north of the park and the adjacent Mutara Hunting Reserve comprise rolling grassy hills and marshy valleys where large herds of topi, waterbuck, zebra and buffalo concentrate in the dry season, and oribi and reedbuck are locally common. Impala are abundant in the central and southern parts of the park, which contain higher hills with deep, narrow valleys covered in Acacia-Combretum wooded savanna. The extensive swamp system (600 sq km) of the Akagera River in the southeast of the park is among the most diverse and best preserved in East Africa, with sitatunga locally common.

Volcanoes National Park and the forest reserves (Fig. 1) contain remnants of montane forest flora and fauna which have international conservation significance (Spinegg 1972; Weber & Vedder 1984). The survival of forest duikers in Rwanda is dependent on protection of these surviving forest fragments; improved protection is required for Nyungwe and the remaining fragment of Gishwati Forest. Antelopes no longer survive in Mukura Forest (20 sq km), the other remaining fragment of forest on the Zaire-Nile Divide within Rwanda.

There are major problems in maintaining parks and reserves in a substantial part of such a densely populated country as Rwanda. The land requirements of the rapidly increasing human population, with intensive agriculture extending right up to reserve boundaries in some areas, poaching of antelopes and other wildlife, and illegal woodcutting, create severe problems. Poaching had a very serious effect on wildlife populations in Akagera National Park in 1982–83, but has since been contained by an increase in the number of park guards (Monfort 1985). Volcanoes National Park has benefited from the support of international conservation organisations to the Mountain Gorilla Project, which has achieved considerable success in preserving the park’s important population of mountain gorillas (Gorilla gorilla beringei), but human encroachment and poaching remain serious problems.

In Nyungwe Forest, management planning, conservation projects and scientific studies are being undertaken with the support of international organisations, bilateral donor agencies and wildlife conservation organisations to improve the protection of the forest (ecological studies, census, reforestation, controlled exploitation, etc.). The unique part of the Gishwati Forest was recently cleared and transformed into highland pastures for cattle farms plus plantations of exotic trees. Only 100 sq km of the natural forest remains, in the southwest of Gishwati, and it needs improved protection to survive. Woodcutting and poaching pose major problems.

Rwanda’s success to date in maintaining the integrity of its conservation areas, particularly the national parks, in the face of such major difficulties represents an outstanding achievement for a densely populated, developing country. This reflects the Government’s awareness of the importance of the national parks and forest reserves for the preservation of the country’s natural resources, protection of important watersheds, and the development of the growing wildlife-based tourist industry.

Conservation Measures Proposed

The long-term survival of Rwanda’s conservation areas depends on a balance being achieved between the needs of the human population and the requirements of wildlife (Harcourt & Fossey 1981; Monfort & Monfort 1982). This is a very difficult objective to achieve in such a small, densely populated country. Continued international support is essential for Rwanda’s efforts to develop effective management plans for its remaining natural ecosystems. These include controlled exploitation and where appropriate reforestation in outer buffer zones, strict control of poaching and human encroachment in core areas, and careful development of tourism. Continuing, long-term international support for conservation education in Rwanda is also essential (Weber & Vedder 1984; Monfort 1985).

Species Accounts

Aspects of the habitat preferences and social organisation of savanna antelopes observed in field studies in Rwanda have been described by Monfort (1972), Monfort et al. (1973), Monfort-Braham (1975), and Verschuren (1965). This account concentrates on the distribution, population and conservation status of each species.
Sitatunga (*Tragelaphus spekii*)

**Distribution & Population:** Formerly occurred throughout the swamps associated with rivers and lakes in eastern and southeastern Rwanda. The rapid expansion of human settlement and associated poaching pressures in these areas now restrict the sitatunga to isolated, inaccessible swamps in the Akagera, Nyabarongo and Akanyaru river and lake systems. The adult males in the Akanyaru and Nyabarongo swamp systems are dark chocolate in colour, as elsewhere in Africa, but the adult males in Akagera National Park are a much lighter beige colour, lighter than the reddish-brown females.

The total population is unknown, but numbers are declining outside Akagera National Park because of hunting and habitat destruction. There is a well protected, stable or increasing population of perhaps 500 in the southeast of Akagera National Park, where sitatunga are very common in the shallow bays with mixed vegetation and patches of open water and in the *Miscanthidium* zones of the Akagera swamp and lake system.

**Status:** Vulnerable. Unlikely to survive outside Akagera National Park. The important swamp habitats within this national park are threatened by the Akagera basin development project, which includes a proposed dam on the Akagera River which would flood the national park’s swamp systems or seriously alter the swamp’s ecology.

Bushbuck (*Tragelaphus scriptus*)

**Distribution & Population:** Formerly widespread; unlike most other antelopes, persists to some extent outside conservation areas in regions which retain sufficient cover. Not uncommon in wooded savanna, and riverine and lakeside forests in the central and southern parts of Akagera National Park, and at lower altitudes in Volcanoes National Park. Also occurs in the forest reserves, in small numbers. Population unknown.

**Status:** Not threatened.

Common Eland (*Tragelaphus oryx*)

**Distribution & Population:** Confined to the northwest and central regions of Akagera National Park and the adjacent Mutara Hunting Reserve. The eland’s preferred grassland habitat is centred on Mutara and formerly extended to the west of the present hunting reserve, in an area where wildlife is now largely excluded by agriculture and large numbers of cattle. Aerial censuses suggest that the population declined from 550–600 in 1969 to 350–500 in 1982.

**Status:** Vulnerable. The prevention of a further decline in the eland population towards endangered status depends on the maintenance of effective protection against human encroachment and poaching in both Akagera National Park and Mutara Hunting Reserve. The latter reserve is particularly important for this species in Rwanda, containing up to 40% of the total population.

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**Table 1**

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*Ex = extinct; En = endangered; V = vulnerable; K = insufficiently known; S = satisfactory (not threatened). See chapter 1 for definition of status categories.
serve, but no live specimens and only one skin have been seen in Rwanda in recent years.

**Status:** Gravely threatened by poisoning. Highly endangered, if it is not already extinct.

**Weys’ Duiker (Cephalophus weysani)**

**Distribution & Population:** Sometimes regarded as the eastern race of Peters’ duiker (*C. callipygus weysani*), this duiker is confined to the Nyungwe Forest Reserve. Population unknown.

**Status:** Threatened by poaching and habitat destruction. Hunting is prohibited in the Nyungwe Forest Reserve, but there is no guard service to enforce the law. Despite legal protection, hides of this duiker were sold in marketplaces until recently. There is no doubt that it is now endangered, and it could possibly already be extinct.

**Blue Duiker (Cephalophus monticola)**

**Distribution, Population & Status:** This species has not been recorded from Rwanda, but it may occur or have existed in the past, e.g., in the submontane forests and humid savannas of the central plateau. This area of Rwanda is now very densely populated, and it has been completely deforested (apart from some gallery forests) by agriculturists and pastoralists since the end of the 19th century.

**Grey Duiker (Sylvicapra grimmia)**

**Distribution & Population:** Formerly widespread, except in dense forest. Persist outside conservation areas where there is sufficient cover, and occurs in savanna woodland, thickets and dry forests within Akagera National Park. Locally common. Ground counts by Spinage et al. (1972) suggested a population of about 500 in Akagera and the adjacent Mutara Hunting Reserve.

**Status:** Not threatened.

**Waterbuck (Kobus ellipsiprymnus defassa)**

**Distribution & Population:** Formerly occurred widely in savanna grasslands close to permanent water. Persist in Akagera National Park and Mutara Hunting Reserve, the population was recently estimated to be 800–1200. Also survives in very small numbers in wooded savanna in the southeast, where it is threatened with extinction in the near future by rapid expansion of human settlement, woodcutting for charcoal, habitat transformation and poaching.

**Status:** Not threatened, as long as Akagera National Park is maintained.

**Bohor Reedbuck (Redunca redunca)**

**Distribution & Population:** Occurs in Akagera National Park and Mutara Hunting Reserve, where Spinage et al. (1972) estimated a population of approximately 850 (about two-thirds in the national park) by ground counts. During a ground census of Mutara Hunting Reserve in 1983, 750 animals were counted, indicating a total population of >1000 in Akagera-Mutara. It is locally abundant on the grassy hills in the north of the national park, where the population concentrates into a few large herds of up to 50 and occasionally more than 100 individuals.

**Status:** Probably satisfactory as long as the Akagera National Park is maintained. I like the eland, a considerable part of this species’ preferred habitat lies within the Mutara Hunting Reserve.

**Roan (Hippotragus equinus)**

**Distribution & Population:** Formerly widespread in the savannas of the east and southeast. It has been exterminated outside Akagera National Park and Mutara Hunting Reserve, where a small population (150–200) persists, mainly in the northern half of the national park.

**Status:** Vulnerable. The small size of the surviving population makes it susceptible to poaching pressures. Despite a high rate of recruitment, the population is not increasing and may have declined slightly during a succession of dry years from 1973 to 1984. It seems that Akagera National Park is a marginal habitat for roan.

**Topi (Damaliscus lunatus jimela)**

**Distribution & Population:** Very common in Akagera National Park and Mutara Hunting Reserve with a total population of more than 5000, mainly in the centre and north of the national park. Large herds of several hundred animals migrate seasonally between the park and the hunting reserve.

**Status:** Not threatened, as long as the conservation areas in which it occurs are maintained.

**Klipspringer (Oreotragus oreotragus)**

**Distribution & Population:** Occurs locally on rocky outcrops and hilltops in the central and southern parts of Akagera National Park, and still occurs in a few unprotected areas elsewhere. Numbers unknown.

**Status:** The status of this species is not well known, but its population in Akagera is probably stable.

**Oribi (Ourebia ourebi)**

**Distribution & Population:** Common in Akagera National Park and Mutara Hunting Reserve, where Spinage et al. (1972) estimated a population of more than 2000 (about two-thirds in the national park) by ground counts.

**Status:** Satisfactory, as long as it continues to receive protection in Akagera-Mutara.

**Impala (Aepyceros melampus)**

**Distribution & Population:** The most abundant antelope in Akagera National Park and Mutara Hunting Reserve (population 15–30,000, largely in the national park). Fluctuations in numbers and movements of population between habitats occur in response to climatic variation and poaching pressure. Poaching is most severe in the southern region of Akagera.

**Status:** Not threatened as long as the conservation areas in which it occurs are maintained.

**References**


Chapter 11: Burundi
Jacques Verschuren

Introduction

Burundi and neighbouring Rwanda are the two most densely populated countries in Africa. Burundi has over four million people in a total area of only 27,834 sq km, with local population densities greater than 400 per sq km. Settlement, intensive agriculture, and large herds of domestic livestock now occupy more than 90% of the land. Consequently, wildlife has largely been eliminated.

Burundi lies on the boundary between the Zaire and Nile watersheds, bordered on the west by the western Rift Valley and its lake system (Fig. 1). Mean annual rainfall is between 1000 and 2000 mm over most of the country. The hills and mountains of the Zaire-Nile Divide in the northwest and west were formerly covered in montane forest. Central and eastern Burundi comprise plateaux at altitudes of 1300 to 2000 m. Moist savannas and swamps characteristic of the Nile basin formerly occurred in the northeast, merging into Brachystegia savanna woodland in the south and southeast. Despite the very high human population, significant remnants of these natural habitats and their wildlife remain (Verschuren 1978a, b).

Current Status of Antelopes

Displacement from their habitats by domestic livestock, habitat degradation caused by woodland cutting and overgrazing by livestock, and the lack of proclaimed conservation areas until very recently have resulted in the loss of many of Burundi’s antelope species (Table 1). The only remaining species whose survival is not threatened to some degree at present are bushbuck and grey duiker. As elsewhere in Africa, these two species show a remarkable ability to survive locally within densely settled areas, provided there is sufficient cover to shelter them during the day.

Most of the species listed as “endangered or extinct” in Table 1, e.g., roan and impala, are probably extinct in Burundi. It is not certain whether some of the species listed as “insufficiently known,” e.g., blue duiker and southern reedbuck, ever occurred in Burundi, but they are certainly greatly reduced or absent now.

Conservation Measures Taken

The government’s increasing awareness of the importance of the conservation of natural resources (Verschuren 1978a) led to the establishment of two national parks and several natural reserves in 1982. The conservation areas which are important for the survival of antelopes are shown in Fig. 1.

Kibira National Park and Bururi Forest National Reserve contain the last remnants of montane forest in Burundi. Kibira (altitude 1500–2660 m) is divided into three separate sections and includes 230 sq km of natural montane forest; together with the adjacent Nyungwe Forest Reserve in Rwanda it comprises the largest surviving fragment of the montane forest of the Zaire-Nile Divide in Rwanda-Burundi. The Bururi reserve is much smaller but is nevertheless of outstanding conservation value, containing the finest emergent Entandrophragma excelsum remaining in Africa, and several primate species including chimpanzee (Pan troglodytes) (Weber & Vedder 1984). Effective protection of these two conservation areas is essential for the survival of forest duikers in Burundi.

Ruvubu National Park in the valley of the Ruvubu River comprises grassland, riverine forests, and Brachystegia Julbernardia savanna; the latter vegetation type, which covers a vast area of south-central Africa, is close to its northerly limit here. This national park is the major stronghold of Burundi’s surviving savanna wildlife (Verschuren 1978a, b). It contains substantial populations of hippopotamus (Hippopotamus amphibius), buffalo (Syncerus caffer), bushbuck and waterbuck.

Rusizi Natural Reserve is situated on the floodplain of the Rusizi River, close to the outskirt of the capital, Bujumbura. The large herds of wildlife which formerly occurred on this floodplain have been eliminated, but hippopotamus, crocodiles, small antelopes and abundant birdlife can still be seen in the Rusizi reserve.

Conservation Measures Proposed

Development and implementation of effective management plans for the recently established conservation areas by the Burundian Institute for Nature Conservation will be essential to ensure the long-term survival of Burundi’s remaining large wild animals. Education to increase the people’s awareness of the value of nature conservation will also be vital. Once effective conservation areas have been established and consolidated, it may be possible to re-introduce species which are now locally extinct into national parks or reserves which contain suitable habitat. It is also possible that some species may repopulate Ruvubu National Park from across the Tanzania border.

Species Accounts

Bushbuck (Tragelaphus scriptus)

Distribution & Population: Formerly very widespread, and still occurs relatively widely except in the most densely settled areas, e.g., it survives in the immediate environs of Bujumbura. It occurs in all of the conservation areas shown in Fig. 1, including several hundred in Ruvubu National Park. Total population unknown. Status: Not actually threatened, although hunting pressure is severe.

Sitatunga (Tragelaphus speki)

Distribution & Population: Formerly occurred widely in swamps. Now found mainly in isolated, inaccessible swamps, e.g., in the Akanyaru and Ruvubu River systems in the northeast, but survives in a number of other swampy zones, even in some densely settled areas. It occurs in Ruvubu National Park, and small numbers may survive on the Rusizi Plain. Status: Indeterminate. It is difficult to assess this species’ status because of its secretive habits.

Blue Duiker (Cephalophus monticola)

Black-fronted Duiker (C. nigritrons)

Yellow-Backed Duiker (C. silvicultor) and Weyns’ Duiker (C. weynsi)

Distribution & Population: These four species of forest duikers may have formerly occurred widely in the montane forests of the Zaire-Nile Divide, but those which survive are now confined to the remaining forest fragments. The black-fronted duiker still occurs in much of the Nyungwe-Kibira forest on both sides of the Rwanda-Burundi border, including Kibira National Park. C. silvicultor and C. weynsi formerly occurred in the Nyungwe Forest in Rwanda, where they may still be present, and may also occur in Kibira National Park. C. weynsi may occur elsewhere in western Burundi, since its range extends southward to Gombe Stream.

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### Table 1
Current Status of Antelopes in Burundi

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National Park and other localities on the eastern shore of Lake Tanganyika in northwestern Tanzania (Kingdon 1982). The populations of these forest duikers in Burundi are unknown. **Status:** Threatened by poaching and destruction of their forest habitats.

**Grey Duiker (Sylvicapra grimmia)**

**Distribution & Population:** Still occurs over considerable parts of its former range, which extended throughout most of the savanna zone of Burundi. Common in Ruvubu National Park and Rusizi Natural Reserve. Numbers unknown.

**Status:** Not actually threatened although it is heavily poached in particular for skins for sale to tourists.

**Waterbuck (Kobus ellipsiprymnus defassa)**

**Distribution & Population:** Formerly occurred widely in savannas and grassland close to permanent water, but it has been eliminated from most of its former range, including the Rusizi Plain. Its major stronghold is now Ruvubu National Park, where there is a population of about 500. This national park comprises a narrow corridor of natural habitats, more than 125 km long but only 2 to 5 km wide, surrounded by intensive cultivation; poaching pressure is high.

**Status:** Rare.

**Bolus Reedbuck (Redunca redunca)**

**Distribution & Population:** Probably occurred widely in savannas and floodplains until displaced by the expansion of human settlement. Still occurs locally and may be present in small numbers in Ruvubu National Park; probably exterminated on the Rusizi Plain.

**Status:** Indeterminate. Its future survival is dependent on the protection of viable populations within conservation areas.

**Common Eland (Tragelaphus oryx)**

**Southern Reedbuck (Redunca arundinum)**

**Roan (Hippotragus equinus)**

**Lichtenstein’s Hartebeest (Alcelaphus lichtensteinii)**

**Topi (Damaliscus lunatus jimela)**

**Klipspringer (Oreotragus oreotragus)**

**Oribi (Ourebia ourebi)** and **Impala (Aepyceros melampus)**

**Distribution, Population & Status:** All of these species, with the possible exception of southern reedbuck, are known or likely to have occurred formerly in the savanna zones of Burundi. Some, e.g., Lichtenstein’s hartebeest, were probably confined to the Brachystegia savannas of the south and east, and others, e.g., topi and oribi, to floodplains, while species such as roan may have occurred more widely. The klipspringer was confined to localised rocky outcrops, mainly in the southeast and east.

Southern reedbuck may have occurred in the southeastern Brachystegia savanna woodland, although the distribution map in Kingdon (1982) suggests that this reedbuck reached its northwestern limit on the southwestern shores of Lake Victoria, well to the east of Burundi.

Savanna antelopes were formerly abundant in such areas as Busoni in the northeast and Mosso in the Malagarazi Valley in the southeast (Verschuren 1978a, b), but it is probable that most, if not all, of this group of species are now extinct in Burundi.

### References


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![Map of Rwanda, Zaire, and Tanzania with conservation areas marked](image)
SECTION 3: STATUS SUMMARY & REGIONAL ACTION PLAN

Chapter 12: Summary of Regional Status of Antelopes in East and Northeast Africa

R. East

Introduction

The individual country accounts (section 2) have summarised what is known about the status of antelopes in each country and outlined conservation priorities. This chapter takes a regional overview of the status of antelopes and identifies the key species and subspecies requiring greater conservation attention in East and Northeast Africa.

Criteria for Assessment of Regional Status of Species

The conservation status of antelopes has been assessed according to Red Data Book categories in the reports on individual countries. These categories, which are defined in chapter 1, provide a useful qualitative overview of the status of antelopes within countries, but difficulties arise in applying them between countries. The distinction between “not threatened” and “vulnerable” or “rare,” for example, depends partly on a subjective interpretation of what comprises a “small” population. This may be several thousand individuals in a large country with abundant antelope fauna, and a few hundred or less in a small, densely populated country with much smaller wildlife populations. These difficulties can only be overcome by defining status categories according to quantitative criteria, such as the number of discrete populations of a species, its total numbers, and the annual rate of population change over, say, a five-year period, as suggested by R.H.V. Bell (in litt. December 1985). Unfortunately, accurate data on population trends, in particular, are lacking for most antelopes in most countries.

Nevertheless, sufficient population data are now available to assess the total regional populations (or at least provide a minimum estimate) of more than half of the antelope species in East and Northeast Africa. In addition, the expansion of human populations and activities means that the total populations of most antelopes in the region, as elsewhere in Africa, are declining outside conservation areas. Partial exceptions are a few species which are able to persist to some extent in non-protected areas where human settlement is expanding, e.g., bushbuck and grey duiker. However, there is a definite threshold of human population density and activity beyond which no antelopes can survive, especially where they are hunted with dogs, nets and/or snare. Stable or increasing populations of most antelopes are now largely or entirely confined to proclaimed and proposed conservation areas.

Quantitative criteria are therefore used to assess regional conservation status, based on estimates of the total population in the region and the occurrence of large, stable or increasing populations in conservation areas (Table 1). Total populations of 10000 and 1000 are arbitrarily selected as the basis of distinction between “not threatened,” “rare” and “endangered,” with account also taken of the number of large populations within conservation areas.

One thousand or more individuals is taken as a “large” population within a conservation area (Table 1, footnote 3), on the grounds that genetic and demographic considerations suggest that a minimum population of several hundred to more than 1000 individuals is necessary for long-term survival under natural conditions (Franklin 1980, Frankel & Soule 1981, Soule & Simberloff 1986). Species confined to East and Northeast Africa are arbitrarily classed as “not threatened” or “rare” if they occur in large, stable or increasing populations in four or more conservation areas, and otherwise as “threatened” or “endangered.” One con-

<table>
<thead>
<tr>
<th>Status</th>
<th>Total No./Distribution &amp; Abundance</th>
<th>Popns. in Cons. Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory/not threatened (S)</td>
<td>≥ 10 000 or Widespread, Common/Moderate Nos.</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Localised, Common</td>
<td>A</td>
</tr>
<tr>
<td>Threatened (T)</td>
<td>≥ 1 000 or Widespread, Common/Moderate Nos./Few</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Localised, Common/Moderate Nos.</td>
<td>B</td>
</tr>
<tr>
<td>Rare (R)</td>
<td>≥ 1 000 &amp; &lt; 10 000 or Widespread, Few</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Localised, Moderate Nos./Few</td>
<td>A</td>
</tr>
<tr>
<td>Endangered (En)</td>
<td>&lt; 1 000 or Localised, Few</td>
<td>B</td>
</tr>
<tr>
<td>Extinct (Ex)</td>
<td>No longer occurs in the wild</td>
<td>—</td>
</tr>
</tbody>
</table>

1 These criteria refer to antelopes whose populations are declining outside conservation areas; species which occur in large, stable or increasing populations outside conservation areas are clearly not under threat regardless of their status within conservation areas. In practice, antelopes which still occur widely in large populations outside conservation areas are also well represented within conservation areas, e.g., bushbuck, grey duiker, dildiks.

2 For species whose numbers are unknown, “localised” and “widespread” refer to their distributions within the region; “few,” “moderate numbers,” and “common” are qualitative assessments of their overall abundance within the areas in which they occur.

3 Large (≥1000) stable or increasing populations known to occur in x conservation areas (including proposed conservation areas) within the region; where numbers unknown, widespread and common within x conservation areas within the region which contain extensive suitable habitat.

For species confined to the region, A: x ≥ 4; B: x < 4.
For species not confined to the region, A: x ≥ 1; B: x = 0.
<table>
<thead>
<tr>
<th>Species</th>
<th>Importance of Region</th>
<th>No. Countries</th>
<th>Total Regional Popn.</th>
<th>Popns. in Cons. Areas</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bushbuck</td>
<td>W</td>
<td>8</td>
<td>widespread, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Mountain Nyla</td>
<td>C</td>
<td>1</td>
<td>2-4000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Giant Eland</td>
<td>W</td>
<td>1 or 2</td>
<td>10-20 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Common Eland</td>
<td>W</td>
<td>6</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Bongo</td>
<td>W</td>
<td>2</td>
<td>3-5000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Lesser Kudu</td>
<td>C</td>
<td>6 or 7</td>
<td>&gt; 40 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Greater Kudu</td>
<td>W</td>
<td>6 or 7</td>
<td>&gt; 10 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Sitatunga</td>
<td>W</td>
<td>6</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Aders' Duiker</td>
<td>C</td>
<td>2</td>
<td>5-10 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Bay Duiker</td>
<td>M</td>
<td>1 (formerly)</td>
<td>formerly localised, few</td>
<td>B</td>
<td>Ex</td>
</tr>
<tr>
<td>White-hellied Duiker</td>
<td>M</td>
<td>1 (formerly)</td>
<td>formerly localised, few</td>
<td>R</td>
<td>Fx</td>
</tr>
<tr>
<td>Harvey's Red Duiker</td>
<td>C</td>
<td>4</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Natal Red Duiker</td>
<td>W</td>
<td>1</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Blue Duiker</td>
<td>W</td>
<td>4 to 6</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Black-fronted Duiker</td>
<td>W</td>
<td>4</td>
<td>localised, moderate nos.</td>
<td>A</td>
<td>R</td>
</tr>
<tr>
<td>Red-flanked Duiker</td>
<td>W</td>
<td>2</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Abbott's Duiker</td>
<td>C</td>
<td>1</td>
<td>localised, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Yellow-backed Duiker</td>
<td>W</td>
<td>4 or 5</td>
<td>localised, moderate nos.</td>
<td>A</td>
<td>R</td>
</tr>
<tr>
<td>Weyns' Duiker</td>
<td>W</td>
<td>6</td>
<td>localised, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Grey Thriker</td>
<td>W</td>
<td>8</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Waterbuck</td>
<td>W</td>
<td>8</td>
<td>&gt; 75 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Kob</td>
<td>W</td>
<td>3</td>
<td>&gt; 1 000 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Nile Lechwe</td>
<td>C</td>
<td>2</td>
<td>30-40 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Puku</td>
<td>W</td>
<td>1</td>
<td>&gt; 40 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Bohor Reedbuck</td>
<td>W</td>
<td>7</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Southern Reedbuck</td>
<td>W</td>
<td>1</td>
<td>&gt; 20 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Mountain Reedbuck</td>
<td>W</td>
<td>5</td>
<td>localised, common</td>
<td>R</td>
<td>T</td>
</tr>
<tr>
<td>Roan</td>
<td>W</td>
<td>6</td>
<td>&gt; 60 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Sable</td>
<td>W</td>
<td>2</td>
<td>&gt; 30 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Scimitar-horned Oryx</td>
<td>M</td>
<td>1</td>
<td>localised, few</td>
<td>B</td>
<td>En</td>
</tr>
<tr>
<td>Beisa &amp; Fringe-eared Oryx</td>
<td>W</td>
<td>6 or 7</td>
<td>&gt; 75 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Addax</td>
<td>M</td>
<td>1</td>
<td>localised, few</td>
<td>B</td>
<td>En</td>
</tr>
<tr>
<td>Wildbeest</td>
<td>W</td>
<td>2</td>
<td>≥ 1 500 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Common Hartebeest</td>
<td>W</td>
<td>5</td>
<td>≥ 200 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Lichtenstein's Hartebeest</td>
<td>W</td>
<td>1</td>
<td>&gt; 50 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Hirola</td>
<td>C</td>
<td>2</td>
<td>≤ 5-10 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Topi</td>
<td>W</td>
<td>7</td>
<td>&gt; 850 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Klipspringer</td>
<td>W</td>
<td>8 or 9</td>
<td>widespread, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Guenther's Dikdik</td>
<td>C</td>
<td>5</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Kirk's Dikdik</td>
<td>W</td>
<td>3</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Piacentini's Dikdik</td>
<td>C</td>
<td>1</td>
<td>localised, common</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Salt's Dikdik</td>
<td>C</td>
<td>5</td>
<td>widespread, common</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Beira</td>
<td>C</td>
<td>2</td>
<td>localised, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Oribi</td>
<td>W</td>
<td>7</td>
<td>&gt; 50 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Steenbok</td>
<td>W</td>
<td>2 or 3</td>
<td>&gt; 10 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Sharpe's Grysob</td>
<td>W</td>
<td>1</td>
<td>localised, moderate nos.</td>
<td>A</td>
<td>R</td>
</tr>
<tr>
<td>Bates' Pigmy Antelope</td>
<td>M</td>
<td>1</td>
<td>localised, few</td>
<td>B</td>
<td>En</td>
</tr>
<tr>
<td>Suni</td>
<td>W</td>
<td>2</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Impala</td>
<td>W</td>
<td>4</td>
<td>≥ 450 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Gerenuk</td>
<td>C</td>
<td>5</td>
<td>≥ 60-80 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Dibatag</td>
<td>C</td>
<td>2</td>
<td>localised, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Damara Gazelle</td>
<td>W</td>
<td>1</td>
<td>localised, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Soemmerring's Gazelle</td>
<td>C</td>
<td>5</td>
<td>widespread, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Grant's Gazelle</td>
<td>C</td>
<td>6</td>
<td>&gt; 350 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Dorcas Gazelle</td>
<td>W</td>
<td>4</td>
<td>widespread, moderate nos.</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Slender-horned Gazelle</td>
<td>W</td>
<td>1</td>
<td>localised, few</td>
<td>B</td>
<td>En</td>
</tr>
<tr>
<td>Red-fronted Gazelle</td>
<td>W</td>
<td>2</td>
<td>widespread, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Speke's Gazelle</td>
<td>C</td>
<td>2</td>
<td>localised, moderate nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Thomson's Gazelle</td>
<td>C</td>
<td>4</td>
<td>&gt; 900 000</td>
<td>A</td>
<td>S</td>
</tr>
</tbody>
</table>

1 C = largely or entirely confined to the region; W = occurs widely outside the region, but region contains internationally significant populations; M = occurs (or formerly occurred) marginally in the region.
2 No. countries within the region in which the species currently occurs.
3 Extrapolated from population estimates obtained by aerial and/or ground censuses over substantial areas of the species' range in East and Northeast Africa (see individual country reports for details). For species whose numbers are unknown, qualitative assessments of distribution and abundance are given (see Table 1, footnote 2).
4 See Table 1, footnote 3.
5 Ex = extinct, En = endangered, R = rare, T = threatened, S = satisfactory/not threatened, as defined in Table 1.

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### Table 3
Current Regional Status of Certain Antelope Subspecies in East and Northeast Africa

<table>
<thead>
<tr>
<th>Subspecies</th>
<th>Importance of Region&lt;sup&gt;1&lt;/sup&gt;</th>
<th>No. Countries&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Total Regional Pomp.&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Popns. in Cons. Areas&lt;sup&gt;4&lt;/sup&gt;</th>
<th>Status&lt;sup&gt;4&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ruwenziro Black-fronted Duiker</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C. nigrifrons rubidus)</td>
<td>C</td>
<td>1</td>
<td>localised, mod. nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Ringed Waterbuck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(K. ellipsiprymnus ellipsiprymnus)</td>
<td>W</td>
<td>4</td>
<td>&gt; 15 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Defassa Waterbuck</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(K. ellipsiprymnus defassa)</td>
<td>W</td>
<td>7</td>
<td>&gt; 50 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>White-eared kob</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(K. kob leucoris)</td>
<td>C</td>
<td>2</td>
<td>&gt; 1 000 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Uganda kob</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(K. kob thomasi)</td>
<td>C</td>
<td>2</td>
<td>≥ 50–100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Beisa Oryx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(O. gazella betsa)</td>
<td>C</td>
<td>5 or 6</td>
<td>&gt; 50 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Fringe-eared Oryx</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(O. gazella callotis)</td>
<td>C</td>
<td>2</td>
<td>≥ 25–30 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Western White-bearded Wildebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(C. taurinus mearnsi)</td>
<td>C</td>
<td>2</td>
<td>≥ 1 500 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Eastern White-bearded Wildebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(C. taurinus albojubatus)</td>
<td>C</td>
<td>2</td>
<td>&gt; 50 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Nyassa Wildebeest</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(C. taurinus johnstoni)</td>
<td>W</td>
<td>1</td>
<td>&gt; 70 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Coke’s Hartebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A. buselaphus cokes)</td>
<td>C</td>
<td>2</td>
<td>&gt; 60 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Lelwel Hartebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A. buselaphus lelwel)</td>
<td>W</td>
<td>4</td>
<td>&gt; 160 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Hybrid Kenya Hartebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A. buselaphus cokes × lelwel)</td>
<td>C</td>
<td>1</td>
<td>5–10 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Swayne’s Hartebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A. buselaphus swaynei)</td>
<td>C</td>
<td>1</td>
<td>2–3000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Tora Hartebeest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A. buselaphus tora)</td>
<td>C</td>
<td>2</td>
<td>localised, few</td>
<td>B</td>
<td>E2n</td>
</tr>
<tr>
<td>1topi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D. lunatus jimela)</td>
<td>C</td>
<td>4</td>
<td>&gt; 100 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Tiang</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D. lunatus tiang)</td>
<td>C</td>
<td>3 or 4</td>
<td>&gt; 700 000</td>
<td>A</td>
<td>S</td>
</tr>
<tr>
<td>Coastal Topi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(D. lunatus topi)</td>
<td>C</td>
<td>2</td>
<td>&gt; 80 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Haggard’s Oribi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(O. ourebi haggardi)</td>
<td>C</td>
<td>2</td>
<td>localised, mod. nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Kenyaa Oribi</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(O. ourebi kentae)</td>
<td>C</td>
<td>1 (formerly)</td>
<td>formerly localised, mod. nos.</td>
<td>B</td>
<td>Ex</td>
</tr>
<tr>
<td>Pelzeln’s Gazelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G. dorcas pelzelnii)</td>
<td>C</td>
<td>2</td>
<td>localised, mod. nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Heuglin’s Gazelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G. ruthuronis tolouara)</td>
<td>C</td>
<td>2</td>
<td>localised, mod. nos.</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Dehlac Gazelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G. soemmerringii subsp. indet.)</td>
<td>C</td>
<td>1</td>
<td>localised, nos. unknown</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Mongalla Gazelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G. thomsonii albonotata)</td>
<td>C</td>
<td>2</td>
<td>300 000</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td>Thomson’s Gazelle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(G. thomsonii thomsonii (incl. nasalii))</td>
<td>C</td>
<td>2</td>
<td>&gt; 600 000</td>
<td>A</td>
<td>S</td>
</tr>
</tbody>
</table>

1,2,3,4,5 See Table 2.

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**Conservation area**, rather than four, is used as the equivalent figure for species which occur elsewhere in Africa, since almost all of these species are well represented in conservation areas outside East and Northeast Africa. Where population estimates are not available, e.g., for most forest duikers, definition of conservation status remains subjective and is based on qualitative assessments of distribution and abundance (Table 1, footnotes 2 and 3).

The quantitative regional status categories defined in Table 1 are italicised to distinguish them from the qualitative Red Data Book categories defined in chapter 1 (apart from “extinct,” which has an identical definition in each system).

**Regional Status of Species and Subspecies**

The current status of antelope species in East and Northeast Africa (considering all nine countries as a regional unit) is assessed in Table 2, using the criteria in Table 1. No species which formerly occurred widely within the region is known to have become ex-
### Table 4

Key Threatened, Rare and Endangered Antelopes in East and Northeast Africa. Asterisks denote antelopes classified as regionally *endangered*, and those classified as *threatened* (Tables 2 and 3) which are at risk of becoming *endangered* in the near future.

<table>
<thead>
<tr>
<th>Species/Subspecies</th>
<th>Habitat</th>
<th>Major Areas of Present Occurrence within Region (important conservation areas in parentheses)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Species Confined to the Region:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Aders' Duiker</em></td>
<td>Coastal forest</td>
<td>Zanzibar Island (Jozani FR), Kenya coast (Sokoke-Arubuko FR)</td>
</tr>
<tr>
<td><em>Abbott's Duiker</em></td>
<td>Montane forest &amp; heath</td>
<td>Tanzanian highlands (Kilimanjaro NP &amp; GR, Uzungwa Mts. NP)</td>
</tr>
<tr>
<td><em>Hirola</em></td>
<td>Semi-arid grassland</td>
<td>southeastern Kenya (Arawale NR, Tsavo NP), southern Somalia</td>
</tr>
<tr>
<td><em>Beira</em></td>
<td>Arid stony hillsides</td>
<td>northern Somalia</td>
</tr>
<tr>
<td><em>Dibutag</em></td>
<td>Arid steppe &amp; thornbush</td>
<td>central Somali coastal hinterland, southeastern Ethiopia</td>
</tr>
<tr>
<td>Mountain Nyalah</td>
<td>Montane forest &amp; heath</td>
<td>southeastern Ethiopian highlands (Bale Mts. NP), southern Sudan (Zerar GR), southwestern Ethiopia (Gambilta NP)</td>
</tr>
<tr>
<td>Nile Lechwe</td>
<td>Swamp &amp; floodplain</td>
<td>central coastal Somalia</td>
</tr>
<tr>
<td>Piacentini's Dikdik</td>
<td>Arid coastal steppe</td>
<td>northeastern Sudan, northern, eastern &amp; southeastern Ethiopian lowlands (Awash NP, Yangudi-Rassa NP, Dahlac Marine NP (Kebir Is.), Harrar Elephant Sanctuary, central Somalia coast &amp; coastal hinterland</td>
</tr>
<tr>
<td>Soemmerring's Gazelle</td>
<td>Arid &amp; semi-arid steppe</td>
<td>northern Somalia, central coastal Somalia</td>
</tr>
<tr>
<td><strong>Speke's Gazelle</strong></td>
<td>Arid steppe</td>
<td></td>
</tr>
<tr>
<td><strong>Highly Distinctive Subspecies Confined to the Region:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Ruwenzori Black-fronted Duiker</em></td>
<td>Montane heath &amp; bamboo</td>
<td>western Uganda (Ruwenzori Mountains FK)</td>
</tr>
<tr>
<td><em>Tora Hartbeest</em></td>
<td>Combretum-Terminalia savanna</td>
<td>eastern Sudan, northwestern Ethiopia (Chire WR, Gash-setit WR, Yeb WR)</td>
</tr>
<tr>
<td><em>Heuglin’s Gazelle</em></td>
<td>Combretum-Terminalia savanna</td>
<td>eastern Sudan (Dinder NP), northwestern Ethiopia (Gash-setit WR, Nakla WR, Yob WR)</td>
</tr>
<tr>
<td>White-eared Kob</td>
<td>Floodplain &amp; savanna grassland</td>
<td>southern Sudan (Boma NP, Zerar GR, Badingilo GR), southwestern Ethiopia (Gambilta NP)</td>
</tr>
<tr>
<td>Hybrid Kenya Hartbeest</td>
<td><em>Acacia</em> savanna &amp; grassland</td>
<td>southwestern Kenya (Meru NP, Lambwe Valley NP)</td>
</tr>
<tr>
<td>Swainy’s Hartbeest</td>
<td><em>Acacia</em> savanna &amp; grassland</td>
<td>Ethiopian Rift Valley (Senkelle Hartbeest Sanctuary, Nechisar NP, Awash NP, Yavello WR)</td>
</tr>
<tr>
<td>Coastal Topi</td>
<td>Coastal savanna</td>
<td>southeastern Kenya (Bonii-Dodori NR), southern Somalia (Lack Badana NP)</td>
</tr>
<tr>
<td>Haggard’s Oribi</td>
<td>Coastal savanna</td>
<td>southeastern Kenya (Bonii-Dodori NR), southern Somalia (Lack Badana NP)</td>
</tr>
<tr>
<td>Peizeln’s Gazelle</td>
<td>Coastal desert</td>
<td>northern Somalia, Dibouti</td>
</tr>
<tr>
<td>Mongalla Gazelle</td>
<td>Floodplain &amp; savanna grassland</td>
<td>southeastern Sudan (Boma NP, Badingilo GR), southwestern Ethiopia (Omo NP)</td>
</tr>
<tr>
<td>Dahlac Gazelle</td>
<td>Arid semi-desert</td>
<td>Kebir Island, Ethiopia (Dahlac Marine NP)</td>
</tr>
<tr>
<td><strong>Species Which Occur Widely Outside the Region:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dama Gazelle</em></td>
<td>Arid steppe &amp; semi-desert</td>
<td>northwestern Sudan</td>
</tr>
<tr>
<td><em>Slender-horned Gazelle</em></td>
<td>Desert</td>
<td>northwestern Sudan</td>
</tr>
<tr>
<td>Giant Eland</td>
<td>Woodland savanna</td>
<td>southwestern Sudan (Southern NP, Langoito NP, Numatina GR, Chekrou GR, Boro GR)</td>
</tr>
<tr>
<td>Bongo</td>
<td>Moist lowland &amp; montane forest</td>
<td>southwestern Sudan (Bangangai GR), Kenya highlands (Aberdare NP &amp; FR, Mt. Kenya NP &amp; FR, South West Mau NatR)</td>
</tr>
<tr>
<td>Black-fronted Duiker</td>
<td>Montane forest, bamboo &amp; heath</td>
<td>Montane areas in Uganda (Bwindi FR, Mt. Elgon FR, Ruwenzori Mts. FR), Kenya (Mt. Elgon NP, Mt Kenya NP), Rwanda (Volcanoe NP, Nyungwe FR), Burundi (Kibira NP)</td>
</tr>
<tr>
<td>Yellow-backed Duiker</td>
<td>Moist lowland &amp; montane forest</td>
<td>southwestern Sudan (Bangangai GR), Uganda (Queen Elizabeth NP, Bwindi FR), Kenya (South West Mau NatR)</td>
</tr>
<tr>
<td>Puku</td>
<td>Floodplain</td>
<td>Kilombero Valley in southern Tanzania</td>
</tr>
<tr>
<td>Mountain Reeduck</td>
<td>Grassy hillsides &amp; broken, rocky country</td>
<td>southern Ethiopia &amp; Rift Valley (Awash NP), northeastern Uganda (Kadam-Debasien GR), southern Kenya (Aberdareas NP), northern Tanzania (Arusha NP, Kilimanjaro NP, Ngorongoro CA)</td>
</tr>
<tr>
<td>Sharpe's Grysbock</td>
<td>Brachystegia woodland</td>
<td>central &amp; southern Tanzania (Selous GR, Ugalla GR)</td>
</tr>
<tr>
<td>Red-fronted Gazelle</td>
<td>Semi-arid steppe &amp; grassland</td>
<td>central Sudan (Dinder NP), northwestern Ethiopia (Yob WR, Nakla WR, Gash-setit WR)</td>
</tr>
</tbody>
</table>

1 NP = National Park, FR = Forest Reserve, GR = Game Reserve, NR = National Reserve, WR = Wildlife Reserve, NatR = Nature Reserve, CA = Conservation Area.
tinct in East and Northeast Africa in the last 50–100 years. Approximately 60% of species are classed as not threatened/satisfactory, with most of the remainder threatened or rare. A lower proportion (<50%) of the 17 species which are confined to East and Northeast Africa (Table 2) is classed as not threatened. All of the five species which occur or formerly occurred marginally in the region are now endangered or extinct in East and Northeast Africa. The slender-horned gazelle is also classed as regionally endangered.

As described in chapter 2, consideration of intraspecific variation in this report is restricted to a small number of subspecies which are of major international conservation significance because they are highly distinctive morphologically, behaviourally, and/or geographically (several were formerly regarded widely as separate species). Most of these subspecies are confined to East and Northeast Africa. Their current regional status is assessed in Table 3, using the criteria in Table 1. Only one of the subspecies included in Table 3, the tara hartebeest, is classed as regionally endangered; the Kenya oribi, which formerly occurred on the lower slopes of Mount Kenya, is believed to be extinct.

Because of the emphasis placed on the occurrence of large populations within conservation areas in the criteria used (Table 1), antelopes which occur in large numbers but in only a few discrete populations may be classed as threatened. The Nile lechwe, for example, has a total population of about 30–40,000 but is confined to two discrete areas, the Sudd swamps of southern Sudan and the Machir-Gambella marshes of southeastern Sudan and southwestern Ethiopia. Large populations of this species occur in only two or three conservation areas and it is therefore classed as threatened. The criteria used thus emphasize the potential vulnerability of antelopes which have very restricted distributions, even if they occur in large numbers.

Among the antelopes classed as regionally threatened in Tables 2 and 3, some are immediately at risk and are likely to decline towards endangered status in the near future if the causal factors continue to operate, viz., Aders’ and Abbott’s duikers, hirola, beira, dibatag and dama gazelle among the species, and Ruwenzi black-fronted duiker and Heuglin’s gazelle among the subspecies. The other antelopes classed as threatened in Tables 2 and 3, with the possible exception of the Dahlia gazelle, are potentially at risk but are unlikely to become endangered within the region in the short term.

Key Species and Subspecies Requiring Greater Conservation Action

While it is important that antelopes whose current regional conservation status is satisfactory continue to receive sufficient attention to maintain their status, antelopes classed as threatened or endangered in Tables 2 and 3, and possibly those classed as rare, require increased conservation attention to enhance their status. A suggested order of priority among threatened, rare and endangered antelopes is:

1. Species confined to East and Northeast Africa.
2. Highly distinctive subspecies confined to East and Northeast Africa.
3. Species which occur widely outside East and Northeast Africa, but with internationally significant populations in the region.

Antelopes which fall into these three priority levels are indicated in Table 4. Within each priority level, increased conservation action is required most urgently for antelopes which are regionally endangered (Tables 2 and 3) or under immediate threat of declining to endangered status.

Most of the few species which occur or occurred only marginally in East and Northeast Africa (Table 2) are widespread and common or abundant elsewhere. The region is therefore of little international importance for the conservation of these species, with the possible exception of scimitar-horned oryx and addax, which are now in immediate danger of extinction throughout their range. Within the region these two species were confined to the northwestern Sudan, where they were formerly common but may no longer occur except as vagrants from Chad.

Table 4 highlights the lack of conservation areas for threatened and endangered antelopes in the arid zones of Somalia (beira, dibatag, Speke’s gazelle, Pelzeln’s gazelle) and northern Sudan (dama gazelle, slender-horned gazelle). Most of the key protected areas for the conservation of individual species and subspecies in other habitats (Table 4) also assume high international priority for the conservation of antelope communities within the region (see chapter 13). Exceptions include the key conservation areas listed in Table 4 for Swayne’s hartebeest and puku.

Ideally, threatened, rare, and endangered antelopes should be represented in several conservation areas. In some cases it may be possible to achieve this by reintroduction into areas within their former range where antelopes no longer occur, as has been achieved with Swayne’s hartebeest in Awash National Park, Ethiopia. In other cases, it may be possible to establish additional reserves where the species still occurs, as suggested for mountain nyala in the Arsi and/or Hararghe mountains, Ethiopia (see chapter 4).

Antelopes for which More Information is Required

Taxonomy: Detailed knowledge of the taxonomic status of antelope populations should obviously precede determination of conservation priorities. The most serious deficiency in antelope classification at present is the incomplete knowledge of forest duiker (Cephalophus spp.) taxonomy; the classification adopted for the Antelope Survey is arbitrary (chapter 2). In particular, the classification of the various "red" duikers which occur in East and Northeast Africa, C. adersi, harveyi, natalensis, nigriprons (including rubidus, which may be a distinct species—see chapter 7), and weynsi, together with related forms from western and central Africa such as C. ogilbyi and callipygus, requires urgent clarification. In many cases, museum specimens are either lacking

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Captive Breeding

As an insurance against extinction in the wild, it would be desirable to establish secure captive breeding populations of at least the species and subspecies in Table 4 which are endemic to the region, plus more widespread species which are under threat throughout their range, e.g., dama and slender-horned gazelles. Captive breeding is an important priority for the antelopes which are most at risk in the region (those marked with asterisks in Table 4). Suitable natural habitats must also be conserved or re-established to enable re-introductions to be made eventually from captive populations.

Data from ISIS (1986) indicate that European and North American zoos and wild animal parks hold sufficient numbers of bongo, Nile lechwe, dama and slender-horned gazelles, and possibly yellow-backed duiker and Speke’s gazelle, to maintain secure captive populations if these genetic resources are managed carefully (Table 5) (Franklin 1980). Additional numbers of some species may be held in zoos elsewhere. In other cases, there are no known captive specimens, e.g., Aders’ and Abbott’s duikers, dibatag and the endangered tora hartebeest. This hartebeest occurs in an area which has been devastated by recurrent drought, and in which political instability and armed conflict have precluded the establishment of secure conservation areas. Its survival may therefore depend on the establishment of a breeding population in captivity by capture and translocation of individuals from the wild, if this is feasible. In all cases, animals transported elsewhere for breeding purposes should be on loan from the countries where they were captured.

References


Chapter 13: Status of Antelope Communities and Identification of Regional Conservation Priorities

R. East

Status of Antelope Communities Outside Conservation Areas

In the more densely populated parts of East and Northeast Africa, such as the Ethiopian and Kenyan highlands, and the Lake Victoria/Nile Basin (Uganda, Rwanda, Burundi, northwestern Tanzania, and southwestern Kenya), most antelope species have been eliminated or reduced to isolated, remnant populations within conservation areas. In many less densely populated areas, antelopes remain widespread outside conservation areas, despite extensive habitat degradation caused by overgrazing by domestic livestock in semi-arid and arid areas, and uncontrolled hunting in many areas. Notable wildlife areas include the southern Sudan,
<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUDAN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northwest</td>
<td>desert, arid steppe</td>
<td>scimitar horned oryx(?), addax(?), dama (?), dorcas, slender-horned(?) &amp; red-fronted gazelles</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Northeast including Red Sea Hills</td>
<td>desert, arid steppe &amp; hills</td>
<td>greater kudu, klipspringer, Salt’s dik dik, dorcas, Soemmerring’s &amp; red-fronted gazelles</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Central (S. Dafur to Blue Nile region)</td>
<td>dry savanna grassland</td>
<td>bushbuck, greater kudu, waterbuck, bohor reedbuck, roan, lelwel &amp; tora(?) hartebeests, tiang, oribi, red-fronted gazelle</td>
<td>1</td>
<td>8000</td>
<td>-</td>
</tr>
<tr>
<td><strong>South</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>wooded savanna, savanna grassland, floodplain &amp; swamp</td>
<td>bushbuck, common eland, giant eland, sitatunga, greater &amp; lesser kudu, red-flanked duiker, grey duiker, waterbuck, white-eared kob, Uganda kob, Nile lechwe, bohor reeduck, roan, beisa oryx, lewel hartebeest, tiang, oribi, Guenther’s dikdik, Grant’s gazelle, Mongolia gazelle</td>
<td>15</td>
<td>82 270</td>
<td>-</td>
</tr>
<tr>
<td>South</td>
<td>moist lowland forest</td>
<td>bushbuck, bongo, blue, red-flanked &amp; yellow-buckled duikers</td>
<td>3</td>
<td>188</td>
<td>-</td>
</tr>
<tr>
<td>South</td>
<td>montane biomes</td>
<td>bushbuck, blue &amp; Weyns’ duikers, mountain reedbuck, klipspringer</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>ETHIOPIA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern &amp; eastern lowlands</td>
<td>arid steppe, thornbush &amp; semi-desert</td>
<td>greater &amp; lesser kudu, beisa oryx, Salt’s &amp; Guenther’s dikdik, gerenuk, dibatag, Soemmerring’s &amp; dorcas gazelles</td>
<td>10</td>
<td>&gt; 10 000</td>
<td>-</td>
</tr>
<tr>
<td>Southern lowlands</td>
<td>semi-arid &amp; arid thornbush</td>
<td>greater &amp; lesser kudu, beisa oryx, Guenther’s dikdik, gerenuk, Grant’s gazelle</td>
<td>8</td>
<td>&gt; 7500</td>
<td>-</td>
</tr>
<tr>
<td>Western lowlands</td>
<td>savanna grassland, floodplain, swamp</td>
<td>bushbuck, greater kudu, grey duiker, waterbuck, white-eared kob, Nile lechwe, bohor reeduck, roan, tora(?) &amp; lewel hartebeests, tiang, oribi, red-fronted gazelle</td>
<td>3</td>
<td>&gt; 2500</td>
<td>-</td>
</tr>
<tr>
<td><strong>SOMALIA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern mts. &amp; coast</td>
<td>arid stony hills &amp; coastal desert</td>
<td>klipspringer, beira, Salt’s dikdik, Pelzein’s gazelle, beira, Guenther’s &amp; Salt’s dikdik, gerenuk, Soemmerring’s gazelle, Speke’s gazelle</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Northern plateau</td>
<td>arid thornbush, semi-desert</td>
<td>lesser kudu, beisa oryx(?) dibatag, Guenther’s, Salt’s &amp; Piacentini’s dikdik, gerenuk, Soemmerring’s &amp; Speke’s gazelles</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Central coastal plain &amp; hinterland</td>
<td>arid thornbush, semi-desert</td>
<td>bushbuck, grey duiker, Harvey’s red duiker(?), waterbuck, coastal topi, Guenther’s &amp; Kirk’s dikdik, oribi</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lower Shebelle &amp; Juba Rivers</td>
<td>riverine grassland, forest-savanna mosaic</td>
<td>lesser kudu, waterbuck, beisa oryx(?) hirola(?) coastal topi, Guenther’s &amp; Kirk’s dikdik, gerenuk, Grant’s gazelle</td>
<td>1</td>
<td>3340</td>
<td>-</td>
</tr>
<tr>
<td><strong>KENYA</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North &amp; East</td>
<td>arid thornbush, semi-desert</td>
<td>common eland, lesser kudu, beisa oryx, tiang &amp; coastal topi, Guenther’s dikdik, impala, gerenuk, Grant’s gazelle</td>
<td>10</td>
<td>12 950</td>
<td>-</td>
</tr>
<tr>
<td>Southeast</td>
<td>semi-arid thornbush, savanna grassland</td>
<td>common eland, lesser kudu, waterbuck, fringe-eared oryx, Coke’s hartebeest, hirola, Kirk’s dikdik, steenbok, impala, gerenuk, Grant’s gazelle</td>
<td>3</td>
<td>22 850</td>
<td>-</td>
</tr>
<tr>
<td><strong>Coast</strong></td>
<td>forest-savanna mosaic</td>
<td>bushbuck, Aders’(?), blue, Harvey’s red &amp; grey duikers, waterbuck, coastal topi, Guenther’s &amp; Kirk’s dikdik, Haggard’s oribi</td>
<td>5</td>
<td>&gt; 3000</td>
<td>-</td>
</tr>
<tr>
<td>West-central (Laikipia, Baringo)</td>
<td>savanna grassland</td>
<td>bushbuck, common eland, grey duiker, waterbuck, beisa oryx, hybrid Kenya hartebeest, klipspringer, Kirk’s dikdik, steenbok, impala, Grant’s &amp; Thomson’s gazelles</td>
<td>1</td>
<td>107</td>
<td>-</td>
</tr>
<tr>
<td>South &amp; Southwest (Narok, Kajiado)</td>
<td>savanna grassland</td>
<td>bushbuck, common eland, grey duiker, waterbuck, fringe-eared oryx, white-bearded wildebeest, Coke’s hartebeest, topi, Kirk’s dikdik, steenbok, impala, Grant’s &amp; Thomson’s gazelles</td>
<td>3</td>
<td>2020</td>
<td>-</td>
</tr>
<tr>
<td>Region</td>
<td>Habits</td>
<td>Major Species</td>
<td>No.</td>
<td>Area (sq km)</td>
<td></td>
</tr>
<tr>
<td>-----------------</td>
<td>-------------------------------</td>
<td>-----------------------------------------------------</td>
<td>-----</td>
<td>--------------</td>
<td></td>
</tr>
<tr>
<td>TANZANIA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>North</td>
<td>savanna grassland, semi-arid thornbush</td>
<td>bushbuck, common eland, lesser kudu, grey duiker, waterbuck, bohor reedbuck, fringe-eared oryx, white-bearded wildebeest, Coke's hartebeest, topi, klipspringer, Kirk's dikdik, oribi, steenbok, impala, gerenuk, Grant's &amp; Thomson's gazelles</td>
<td>8</td>
<td>31 600</td>
<td></td>
</tr>
<tr>
<td>Coast &amp; Zanzibar Is.</td>
<td>forest-savanna mosaic</td>
<td>bushbuck, Aders', blue, Harvey's &amp; Natal red duikers, sml</td>
<td>1*</td>
<td>10 000</td>
<td></td>
</tr>
<tr>
<td>South &amp; West</td>
<td>Brachystegia woodland, floodplain and swamp</td>
<td>bushbuck, common eland, greater kudu, sitatunga, grey duiker, waterbuck, puku, bohor &amp; southern reebucks, roan, sable, Nyassa wildebeest, Lichtenstein's hartebeest, topi, klipspringer, oribi, Sharpe's grysbok, impala</td>
<td>10</td>
<td>98 900</td>
<td></td>
</tr>
</tbody>
</table>

1 Species which occur widely within suitable habitat; question marks indicate species which were formerly common but are now probably greatly reduced or eliminated.
2 Includes proclaimed and proposed conservation areas.
3 Excluding forest reserves on Zanzibar Island.

and considerable parts of the Ethiopian lowlands, Somalia, and Kenya and Tanzania rangelands.

Table 1 summarises parts of East and Northeast Africa where antelopes survive in substantial numbers outside conservation areas. Rapid human population growth and the expansion of both agricultural settlement and livestock numbers ensure that human influences in these areas will increase to much higher levels than at present over the next one to two decades. The long-term survival of antelope communities outside conservation areas is dependent on development programmes which achieve an acceptable compromise between the needs of local people and the requirements of wildlife. Human needs will obviously have the higher priority. Long-term persistence of substantial wildlife populations outside conservation areas will only be possible if eco-

<table>
<thead>
<tr>
<th>Status within Region¹</th>
<th>Antelopes Confined to Region</th>
<th>Antelopes Widespread Outside Region²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Popn. Score</td>
<td>Popn. Score</td>
</tr>
<tr>
<td>Endangered</td>
<td>≥ 100 7</td>
<td>&lt; 100 4</td>
</tr>
<tr>
<td>Rare/threatened</td>
<td>&gt; 500 6</td>
<td>&lt; 500 3</td>
</tr>
<tr>
<td>Satisfactory</td>
<td>≤ 1000 3</td>
<td>&lt; 1000 2</td>
</tr>
</tbody>
</table>

1 See chapter 12.  
2 Population within area; where numbers are unknown, major populations (≥ 100 for endangered antelopes, > 500 for rare/threatened antelopes, ≤ 1000 for antelopes whose status is satisfactory) are assumed to occur in areas where the species/subspecies is known to be widespread and relatively common, and there is an extensive area of suitable habitat.
3 Includes antelopes for which the region contains internationally significant populations, and those which occur only marginally within the region.

Example of Calculation: Akagera National Park—Mutara Hunting Reserve (Rwanda)

<table>
<thead>
<tr>
<th>Species/Subspecies</th>
<th>Importance of Region¹</th>
<th>Status Within Region²</th>
<th>Popn./Status in Akagera-Mutara³</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bushbuck</td>
<td>W</td>
<td>S</td>
<td>widespread, common</td>
<td>3</td>
</tr>
<tr>
<td>Common Eland</td>
<td>W</td>
<td>S</td>
<td>350-500</td>
<td>1</td>
</tr>
<tr>
<td>Sitatunga</td>
<td>W</td>
<td>S</td>
<td>about 500</td>
<td>1</td>
</tr>
<tr>
<td>Grey Duiker</td>
<td>W</td>
<td>S</td>
<td>about 500</td>
<td>1</td>
</tr>
<tr>
<td>Defassa Waterbuck</td>
<td>W</td>
<td>S</td>
<td>about 1000</td>
<td>3</td>
</tr>
<tr>
<td>Bohor Reebuck</td>
<td>W</td>
<td>S</td>
<td>1000+</td>
<td>3</td>
</tr>
<tr>
<td>Roan</td>
<td>W</td>
<td>S</td>
<td>150-200</td>
<td>1</td>
</tr>
<tr>
<td>Topi (jimela subspecies)</td>
<td>C</td>
<td>S</td>
<td>5000+</td>
<td>5</td>
</tr>
<tr>
<td>Klipspringer</td>
<td>W</td>
<td>S</td>
<td>localised, few</td>
<td>1</td>
</tr>
<tr>
<td>Oribi</td>
<td>W</td>
<td>S</td>
<td>2000+</td>
<td>3</td>
</tr>
<tr>
<td>Impala</td>
<td>W</td>
<td>S</td>
<td>15-30 000</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Score = 25

1 W = occurs widely outside East & Northeast African region; C = largely or entirely confined to the region.
2 S = satisfactory.
3 See chapter 10.
systems are managed to conserve essential life-support processes and prevent habitat degradation.

Need for Additional Conservation Areas: In most of the areas where substantial antelope populations survive outside conservation areas, extensive tracts of land have been set aside, at least on paper, for the conservation of natural ecosystems (including conservation areas proposed at governmental level but not yet gazetted) (Table 1). As noted in chapter 12 from the viewpoint of species conservation, the most notable exceptions are northern and central Somalia, the arid zones of the northern Sudan. Conservation areas are also lacking or inadequate in the lowland and montane forests of the southern Sudan. Consolidation and expansion of the existing protected areas in the southern lowland forests and establishment of new montane conservation areas are essential to prevent Sudan’s natural forests from being devastated by agricultural and forestry development.

Upgrading of antelope conservation on Zanzibar Island, e.g., by establishing a national park or game reserve within the existing system of forest reserves, is also an important priority.

Status of Antelope Communities within Conservation Areas

Criteria for Assessment of Priorities: On paper the existing network of national parks and reserves in Africa is more than adequate to ensure the survival of most species of large mammals (e.g., East 1981a; Parker 1984). In practice, the protection and management of these ranges ranges from highly effective to non-existent, with finance a major limitation.

Selection of priorities among conservation areas for the allocation of limited financial support at a regional or continental level requires some system of comparing the antelope communities of different areas. Considerable progress has been made towards a quantitative assessment of criteria for conservation action by the IUCN/SSC African Elephant and African Rhino Specialist Group (Cumming & Jackson 1984). Development of the ideas of Parker (1984) led to a system of ranking the importance of individual areas or populations according to three criteria: biological importance, conservation status, and national and economic importance. This system was applied separately to Africa’s one elephant and two rhinoceros species by detailed allocation of points for a series of categories within each criterion, and the results plotted 3-dimensionally (Cumming & Jackson 1984). A fourth criterion, landscape and amenity value, was subsequently added (Cumming 1984). Modifications of this system are likely to be increasingly important for determining conservation priorities (Bell & Martin 1986; Clarke & Bell 1986).

With antelopes we are dealing not with three species, but with more than 50 species in East and Northeast Africa alone. A simpler approach is therefore preferable to that adopted for identifying priorities in elephant and rhino conservation. Biological importance is the major criterion (Cumming & Jackson 1984). The approach adopted here is to assign a score for each species’ population according to the criteria in Table 2. Any scoring system is inevitably arbitrary; that in Table 2 emphasizes (a) genetic rarity, with antelopes confined to the region scoring more than those which are more widespread, (b) population size, (c) current status (endemic antelopes only) as assessed in chapter 12, with endangered antelopes scoring highest and those which are not threatened scoring lowest. The regional status of each species or subspecies (chapter 12) was used in deriving its score for each area in which it occurs. No additional scores were given for threatened, rare or endangered status within the region in the case of antelopes which occur widely elsewhere, since with only a few exceptions (scimitar-horned oryx, addax, dama and slender-horned gazelles) the status of these antelopes is satisfactory elsewhere in their range outside East and Northeast Africa.

Fig. 1. Major biogeographic divisions (phytochoria) in East and Northeast Africa, as recognised by White (1983) and used by MacKinnon & MacKinnon (1986) to review the protected areas of the Afro-tropical biogeographic realm. Phytochoria are numbered as in MacKinnon & MacKinnon (1986)—II: Zambezian regional centre of endemism; III: Sudanian regional centre of endemism; IV: Somalia-Masai regional centre of endemism; VIII: Afrotropical archipelago-like regional centre of endemism; XI: Guinea-Congolia/Sudania regional transition zone; XII: Lake Victoria regional mosaic; XIII: Zanzibar-Inhambane regional mosaic; XVI: Sahel regional transition zone; XVII: Sahara regional transition zone.

The second and third criteria used for assessing areas for elephant and rhinoceros conservation priorities, conservation status (degree of administration and law enforcement, political climate, land pressures, poaching threat) and national and economic importance (economic values conflicting with wildlife use, national conservation importance and investment, economic potential of wildlife) tend to be correlated, e.g., $r = 0.41$ ($P < 0.01$) for the 36 areas considered for elephant conservation in East and Northeast Africa in Cumming & Jackson (1984). For antelopes, only one of these two criteria, conservation status of individual areas, is considered. This is based on the scoring system used by MacKinnon & MacKinnon (1986) to evaluate the effectiveness of management of protected areas in the Afro-tropical realm.

For each conservation area containing significant antelope populations, the score for biological importance was taken as the sum of the individual species/subspecies scores (each calculated according to Table 2) for that area. The conservation status of each area was taken directly from MacKinnon & MacKinnon (1986); their rankings were modified slightly for a few areas to reflect the effectiveness of protection and management as it affects antelopes in particular. The results are shown separately for each of the region’s major biogeographic divisions (Fig. 1) in Table 3. Conservation areas in the Lake Victoria regional mosaic are treated separately for bushland-grassland-woodland and forest, as these two biomes have highly distinct antelope faunas.

Lack of information on antelope populations restricts the iden-
<table>
<thead>
<tr>
<th>Conservation Area</th>
<th>No. Spp.</th>
<th>Biological Importance</th>
<th>Species Occurring in Major Populations</th>
<th>Conservation Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SUDANIAN REGIONAL CENTRE OF ENDEMISM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sudan:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boma NP (part)</td>
<td>13</td>
<td>41*</td>
<td>bushbuck, common eland, white-eared kob, bohor reedbuck, roan, lewel hartebeest, tiang, oribi, Mongalla gazelle</td>
<td>4</td>
</tr>
<tr>
<td>Southern NP</td>
<td>11</td>
<td>32*</td>
<td>bushbuck, giant eland, red-flanked &amp; grey duikers, waterbuck, Uganda kob, roan, lewel hartebeest, oribi</td>
<td>4</td>
</tr>
<tr>
<td>Baringa GR</td>
<td>11</td>
<td>31</td>
<td>white-eared kob, bohor reedbuck, roan, tiang, oribi, Mongalla gazelle</td>
<td>4</td>
</tr>
<tr>
<td>Kidepo GR</td>
<td>16</td>
<td>21</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Zeraf GR</td>
<td>7</td>
<td>20*</td>
<td>sitatunga, white-eared kob, Nile lechwe</td>
<td>3</td>
</tr>
<tr>
<td>Mesha GR</td>
<td>9</td>
<td>19</td>
<td>Uganda kob, lewel hartebeest, tiang</td>
<td>4</td>
</tr>
<tr>
<td>Sambe GR</td>
<td>10</td>
<td>15</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Dinder NP</td>
<td>8</td>
<td>13</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Bororo GR</td>
<td>11</td>
<td>13</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Numatina GR</td>
<td>11</td>
<td>13</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Ashana-Chelkou GR</td>
<td>10</td>
<td>12</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Fanyikang GR</td>
<td>7</td>
<td>10</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Nimule NP</td>
<td>8</td>
<td>9</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Juba GR</td>
<td>7</td>
<td>7</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>ETHIOPIA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gambella NP</td>
<td>10</td>
<td>21</td>
<td>white-eared kob, Nile lechwe, bohor reedbuck</td>
<td>4</td>
</tr>
<tr>
<td>Yob WR</td>
<td>10</td>
<td>21</td>
<td>lewel hartebeest, red-fronted (Heuglin’s) gazelle</td>
<td>4</td>
</tr>
<tr>
<td>Gash-setit WR</td>
<td>8</td>
<td>19</td>
<td>lewel hartebeest, red-fronted (Heuglin’s) gazelle</td>
<td>4</td>
</tr>
<tr>
<td>Chiri WR</td>
<td>8</td>
<td>19</td>
<td>lewel hartebeest, red-fronted (Heuglin’s) gazelle</td>
<td>4</td>
</tr>
<tr>
<td><strong>UGANDA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kidepo Valley NP</td>
<td>14</td>
<td>22*</td>
<td>lewel hartebeest, Guenther’s dikdik</td>
<td>2</td>
</tr>
<tr>
<td>Aja GR</td>
<td>4</td>
<td>4</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>KENYA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sawa Swamp NP</td>
<td>2</td>
<td>2*</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>SOMALIA-MASAI REGIONAL CENTRE OF ENDEMISM</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Sudan:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boma NP (part)</td>
<td>12</td>
<td>29*</td>
<td>common eland, beisa oryx, Guenther’s dikdik, Grant’s gazelle</td>
<td>4</td>
</tr>
<tr>
<td><strong>ETHIOPIA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omo NP–Tama WR–Mago NP</td>
<td>16</td>
<td>47*</td>
<td>common eland, lesser kudu, beisa oryx, tiang, Guenther’s dikdik, gerenuk, Grant’s &amp; Mongalla gazelles</td>
<td>3</td>
</tr>
<tr>
<td>Awash NP–Awash W. WR–Alledeghi WR</td>
<td>11</td>
<td>29*</td>
<td>mt. reedbuck, beisa oryx, Salt’s dikdik, Soemmerring’s gazelles</td>
<td>3</td>
</tr>
<tr>
<td>Harrar Elephant Sanctuary</td>
<td>8</td>
<td>24</td>
<td>Salt’s &amp; Guenther’s dikdik, gerenuk</td>
<td>3</td>
</tr>
<tr>
<td>Yangudi Rassa NP–Gewe WR–Mille-sordo WR</td>
<td>5</td>
<td>24</td>
<td>beisa oryx, Salt’s dikdik, gerenuk, Soemmerring’s &amp; dorcas gazelles</td>
<td>3</td>
</tr>
<tr>
<td>Chew Bahar WR</td>
<td>11</td>
<td>17</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Nechisar NP</td>
<td>10</td>
<td>14</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Yavello WR</td>
<td>7</td>
<td>13</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Abiyatta-Shalla Lakes NP</td>
<td>9</td>
<td>10</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Senkelle Hartebeest Sanctuary</td>
<td>4</td>
<td>9*</td>
<td>Swayne’s hartebeest</td>
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<tr>
<td>Dahlab Marine NP</td>
<td>1</td>
<td>6</td>
<td>Dahlab gazelle</td>
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<td><strong>SOMALIA:</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Lack Badana NP (part)</td>
<td>8</td>
<td>25</td>
<td>lesser kudu, coastal topi, Kirk’s dikdik, gerenuk</td>
<td>3</td>
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<tr>
<td><strong>UGANDA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kadam–Debasien GR</td>
<td>12</td>
<td>16</td>
<td>mt. reedbuck</td>
<td>4</td>
</tr>
<tr>
<td>Ikobora GR</td>
<td>6</td>
<td>12</td>
<td>Guenther’s dikdik</td>
<td>3</td>
</tr>
<tr>
<td>Matheniko GR</td>
<td>6</td>
<td>10</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>KENYA:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tsavo NP</td>
<td>16</td>
<td>53*</td>
<td>common eland, lesser kudu, waterbuck, fringe-eared oryx, Coke’s hartebeest, klipspringer, Kirk’s dikdik, steenbok, impala, gerenuk, Grant’s gazelle</td>
<td>2</td>
</tr>
<tr>
<td>Meru NP–Rahole NR–Kora NR</td>
<td>14</td>
<td>45</td>
<td>lesser kudu, waterbuck, beisa &amp; fringe-eared oryx, hybrid Kenyan hartebeest, Guenther’s &amp; Kirk’s dikdik, impala, gerenuk, Grant’s gazelle</td>
<td>2</td>
</tr>
<tr>
<td>Conservation Area</td>
<td>No. Spp.</td>
<td>Biological Importance</td>
<td>Species Occurring in Major Populations</td>
<td>Conservation Status</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------</td>
<td>-----------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Masai Mara NR</td>
<td>17</td>
<td>39*</td>
<td>common eland, white-bearded wildebeest, Coke’s hartebeest, topi, impala, Grant’s &amp; Thomson’s gazelles</td>
<td>2</td>
</tr>
<tr>
<td>Samburu-Isiolo NR-Shaba NR</td>
<td>13</td>
<td>36*</td>
<td>beisa oryx, Guenther’s &amp; Kirk’s dikdiks, impala, gerenuk, Grant’s gazelle</td>
<td>2</td>
</tr>
<tr>
<td>Amboseli NP</td>
<td>16</td>
<td>30*</td>
<td>white-bearded wildebeest, impala, Grant’s gazelle</td>
<td>2</td>
</tr>
<tr>
<td>Sibili NP</td>
<td>7</td>
<td>25*</td>
<td>beisa oryx, tiang, Guenther’s dikdik, Grant’s gazelle</td>
<td>2</td>
</tr>
<tr>
<td>Nairobi NP</td>
<td>15</td>
<td>23*</td>
<td>white-bearded wildebeest, Coke’s hartebeest</td>
<td>1</td>
</tr>
<tr>
<td>Lake Nakuru NP</td>
<td>12</td>
<td>18*</td>
<td>waterbuck, impala</td>
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<tr>
<td>Losai NR</td>
<td>9</td>
<td>17</td>
<td>Guenther’s dikdik</td>
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<td>Marsabit NR</td>
<td>9</td>
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<tr>
<td>Hell’s Gate NP</td>
<td>10</td>
<td>12</td>
<td></td>
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</tr>
<tr>
<td>Lake Bogoria NR</td>
<td>8</td>
<td>10</td>
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<td><strong>TANZANIA:</strong></td>
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</tr>
<tr>
<td>Serengeti NP-Maswa GR-Ngorongoro CA</td>
<td>21</td>
<td>66*</td>
<td>bushbuck, common eland, grey duiker, waterbuck, bohor reedbuck, fringe-eared oryx, white-bearded wildebeest, Coke’s hartebeest, topi, Kirk’s dikdik, oribi, steenbok, impala, Grant’s &amp; Thomson’s gazelles</td>
<td>2</td>
</tr>
<tr>
<td>Tarangire NP</td>
<td>15</td>
<td>41*</td>
<td>common eland, fringe-eared oryx, white-bearded wildebeest, Coke’s hartebeest, Kirk’s dikdik, impala, Grant’s &amp; Thomson’s gazelles</td>
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</tr>
<tr>
<td>Ruaha NP-Rungwa-Kizigo GR (part)</td>
<td>16</td>
<td>37*</td>
<td>bushbuck, greater kudu, lesser kudu, common eland, grey duiker, waterbuck, Kirk’s dikdik, impala</td>
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</tr>
<tr>
<td>Mkomazi-Umba GR</td>
<td>14</td>
<td>29*</td>
<td>Coke’s hartebeest, Kirk’s dikdik, gerenuk</td>
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<td>Lake Manyara NP</td>
<td>12</td>
<td>17*</td>
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<td><strong>AFROMONTANE REGIONAL CENTRE OF ENDEMISM</strong></td>
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<td><strong>ETHIOPIA:</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Bale Mts. NP</td>
<td>6</td>
<td>23</td>
<td>bushbuck, mt. nyla, Harvey’s(?) red duiker, grey duiker, bohor reedbuck, klipspringer</td>
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<td>Nakafr WR</td>
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<td></td>
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<td></td>
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<tr>
<td>Mt. Elgon FR</td>
<td>6</td>
<td>14</td>
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<tr>
<td>Bwindi FR</td>
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<td>9</td>
<td>bushbuck, black fronted &amp; yellow-backed duikers</td>
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<td>Ruwenzori Mts. FR</td>
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<td>Ruwenzori black-fronted duiker</td>
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<td>Bufumbira Gorilla Sanctuary</td>
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<td><strong>KENYA:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Aberdarens NP &amp; FR</td>
<td>10</td>
<td>26</td>
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<tr>
<td>Mt. Kenya NP &amp; FR</td>
<td>9</td>
<td>25</td>
<td>bushbuck, Harvey’s red, black-fronted &amp; grey duikers, klipspringer, steenbok, suni</td>
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<tr>
<td>Mt. Elgon NP</td>
<td>7</td>
<td>17</td>
<td>bushbuck, blue, black-fronted, Weyns’ &amp; grey duikers</td>
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<tr>
<td>South West Mau NatR</td>
<td>4</td>
<td>13</td>
<td>bushbuck, bongo, Weyns’ duiker</td>
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<tr>
<td>Cherengani-Kongelai FR</td>
<td>2</td>
<td>6</td>
<td>bushbuck</td>
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<td><strong>TANZANIA:</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Kilimanjaro NP &amp; GR</td>
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<td>26</td>
<td>bushbuck, Harvey’s red &amp; Abbott’s duikers, mt. reedbuck, klipspringer, suni</td>
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<tr>
<td>Uzungwa Mts. NP (part)</td>
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<td>23</td>
<td>bushbuck, blue, Harvey’s red &amp; Abbott’s duikers, suni</td>
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<tr>
<td>Ngorongoro CA (part)</td>
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<td>bushbuck, mt. reedbuck, klipspringer, steenbok</td>
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<tr>
<td>Arusha NP</td>
<td>11</td>
<td>13</td>
<td></td>
<td>3</td>
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<td>Mahari Mts. NP (part)</td>
<td>4</td>
<td>8</td>
<td>bushbuck, Weyns’ duiker</td>
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<tr>
<td>Gombe Stream NP (part)</td>
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<td><strong>RWANDA:</strong></td>
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<td></td>
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<tr>
<td>Nyungwe FR</td>
<td>4</td>
<td>8</td>
<td>bushbuck, black-fronted duiker</td>
<td>3</td>
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<tr>
<td>Volcanoes NP</td>
<td>3</td>
<td>7</td>
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<td>Gishwati FR</td>
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<td><strong>BURUNDI:</strong></td>
<td></td>
<td></td>
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<td>Kihim NP</td>
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<td>Bururi Forest NatR</td>
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<td>No. Spp.¹</td>
<td>Biological Importance¹</td>
<td>Species Occurring in Major Populations</td>
<td>Conservation Status¹</td>
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<td>SUDAN:</td>
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<td>Bangangai GR &amp; adjacent area</td>
<td>8</td>
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<td>Lantoto NP</td>
<td>11</td>
<td>12</td>
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<td><strong>LAKE VICTORIA REGIONAL MOSAIC (Bushland/Grassland, Woodland)</strong></td>
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<td>UGANDA:</td>
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<td>Queen Elizabeth NP &amp; contiguous GRs</td>
<td>10</td>
<td>24*</td>
<td>bushbuck, grey duiker, waterbuck, Uganda kob, topi</td>
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<tr>
<td>Murchison Falls NP &amp; contiguous GRs</td>
<td>9</td>
<td>23*</td>
<td>bushbuck, grey duiker, waterbuck, Uganda kob, lelwel harte-beest, oribi</td>
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<td>Lake Mburo NP</td>
<td>11</td>
<td>12</td>
<td></td>
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<td>Toro GR</td>
<td>6</td>
<td>10*</td>
<td>Uganda kob</td>
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<td>Katonga GR</td>
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<td>Nkosi Is. Sitatunga Sanctuary</td>
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<td></td>
<td></td>
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<td>Lambwe Valley NP</td>
<td>9</td>
<td>12</td>
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<td><strong>TANZANIA:</strong></td>
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<td></td>
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<td>Biharamulo Burigi GR</td>
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<td>19*</td>
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<td>Rumaninya Orungu Nd GR</td>
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<td>Ibanda Arena GR</td>
<td>9</td>
<td>10</td>
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<td>Rubondo Is. NP</td>
<td>4</td>
<td>8</td>
<td>bushbuck, sitatunga</td>
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<td>Akagera NP-Mutara HR</td>
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<td>25*</td>
<td>bushbuck, waterbuck, bohor redbuck, topi, oribi, impala</td>
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<td><strong>BURUNDI:</strong></td>
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<td>Ruvubu NP</td>
<td>3</td>
<td>3*</td>
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<td><strong>LAKE VICTORIA REGIONAL MOSAIC (Forest)</strong></td>
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<tr>
<td>UGANDA:</td>
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<tr>
<td>Bwamba FR</td>
<td>5</td>
<td>13</td>
<td>bushbuck, blue &amp; Weyns' duikers, Bates' pigmy antelope</td>
<td>3</td>
</tr>
<tr>
<td>Kibale FR</td>
<td>5</td>
<td>13</td>
<td>bushbuck, blue &amp; Weyns' duikers, Bates' pigmy antelope</td>
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<tr>
<td>Queen Elizabeth NP-Kigezi GR (part: Maragambo Forest)</td>
<td>4</td>
<td>12</td>
<td>bushbuck, blue, yellow-backed &amp; Weyns' duikers</td>
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<tr>
<td>Maramagambo-Kalinzu FR &amp; Kasyoha-Kitomi FR</td>
<td>4</td>
<td>12</td>
<td>bushbuck, blue &amp; Weyns' duikers, Bates' pigmy antelope</td>
<td>3</td>
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<td>Bugoma FR</td>
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<td>bushbuck, blue &amp; Weyns' duikers</td>
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<td>Budongo FR</td>
<td>3</td>
<td>9</td>
<td>bushbuck, blue &amp; Weyns' duikers</td>
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<tr>
<td>Mabira FR</td>
<td>3</td>
<td>9</td>
<td>bushbuck, blue &amp; Weyns' duikers</td>
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</tr>
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<td>Sango Bay FR</td>
<td>3</td>
<td>5</td>
<td>blue duiker</td>
<td>3</td>
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<tr>
<td>Iwara FR</td>
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<tr>
<td>Kakamega Forest NP-Nandi FR</td>
<td>4</td>
<td>10</td>
<td>bushbuck, blue &amp; Weyns' duikers</td>
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<td><strong>ZANZIBAR-INHAMBANE REGIONAL MOSAIC</strong></td>
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<td>SOMALIA:</td>
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<td>Lack Badana NP (puri)</td>
<td>8</td>
<td>16</td>
<td>coastal topi</td>
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<td></td>
</tr>
<tr>
<td>Boni-Dodori NR</td>
<td>8</td>
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<td>Harvey's red duiker, coastal topi, Guenther's &amp; Kirk's dik-diks, Haggard's oribi</td>
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<tr>
<td>Arawale NR</td>
<td>11</td>
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<td>Sokoko-Arabuko FR</td>
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<td>12</td>
<td>bushbuck, Aders' &amp; blue duikers</td>
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<tr>
<td>Tana River NR</td>
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<td>Shimba Hills NR</td>
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<td>TANZANIA:</td>
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<tr>
<td>Selous GR (part)</td>
<td>6</td>
<td>16</td>
<td>bushbuck, Natal red duiker, waterbuck, suni</td>
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<td>Jozani FR &amp; other FRs on Zanzibar Is.</td>
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<td>Aders' &amp; blue duikers, suni</td>
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<td><strong>ZAMBEZIAN REGIONAL CENTRE OF ENDEMISM</strong></td>
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<tr>
<td>Selous GR (part)</td>
<td>18</td>
<td>48*</td>
<td>bushbuck, common eland, greater kudu, grey &amp; Natal red</td>
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<td>Conservation Area</td>
<td>No. Spp.</td>
<td>Biological Importance</td>
<td>Species Occurring in Major Populations</td>
<td>Conservation Status</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>----------</td>
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<td>---------------------</td>
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<tr>
<td>Ruaha NP–Rungwa-Kizigo GR (part)</td>
<td>16</td>
<td>35*</td>
<td>duikers, waterbuck, southern &amp; bushveldbuck, sable, Nyassa wildebeest, Lichtenstein’s hartebeest, Sharpe’s grysbok, suni, impala</td>
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<tr>
<td>Moyowosi GR</td>
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<td>25*</td>
<td>bushbuck, greater kudu, common eland, grey duiker, waterbuck, roan, sable, Lichtenstein’s hartebeest, common eland, sitatunga, waterbuck, sable, Lichtenstein’s hartebeest, topi</td>
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<tr>
<td>Ugalla GR</td>
<td>15</td>
<td>25</td>
<td>greater kudu, Lichtenstein’s hartebeest, Sharpe’s grysbok, impala</td>
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</tr>
<tr>
<td>Katavi NP</td>
<td>12</td>
<td>17</td>
<td>topi</td>
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</tr>
<tr>
<td>Mikumi NP</td>
<td>11</td>
<td>16*</td>
<td>Nyassa wildebeest, impala</td>
<td>2</td>
</tr>
<tr>
<td>Uwanda GR</td>
<td>6</td>
<td>12*</td>
<td>puku, topi</td>
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</tr>
<tr>
<td>Kilombero Valley</td>
<td>5</td>
<td>11*</td>
<td>puku, sable, Lichtenstein’s hartebeest</td>
<td>3</td>
</tr>
<tr>
<td>Uzungwa Mts. NP (part)</td>
<td>9</td>
<td>10</td>
<td>grey duiker</td>
<td>3</td>
</tr>
<tr>
<td>Mahari Mts. NP (part)</td>
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<td>9</td>
<td></td>
<td>1</td>
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<tr>
<td>Gombe Stream NP (part)</td>
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<td>2</td>
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</tr>
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</table>

1 Total number of antelope species occurring; refers only to those species occurring within the specific biogeographic unit.
2 Sum of scores for each species calculated as in Table 2; asterisks denote scores based on population estimates.

The scoring system in Table 2 is arbitrary and merely provides a framework for the discussion and examination of priorities. Such scoring systems should not dictate the selection of priorities.

Given the limited resources for international conservation action, attention can be focussed on maintaining the status of these areas with high scores for both biological importance and conservation status, and/or improving conservation status where it is currently moderate or low for areas of high biological importance. There are several other important considerations in setting priorities. These include the cost-effectiveness of any proposed action, its feasibility, practicality, and chances of long-term success, and the resources required (other things being equal), areas requiring fewer inputs to maintain or improve their status should be given a higher priority than those requiring greater inputs (Cuming & Jackson 1984).

Table 4 lists areas identified as having outstanding international importance for antelope conservation. There is a critical lack of high or moderate-high conservation status for areas with high biological values for antelope conservation in the Sudanian, Guinea-Congolian/Sudanian, and Zanzibar–Uluambwe divisional units. The Sudanian regional centre of endemism includes most of the region’s important floodplain and swamp systems (Boma and Gambella National Parks, Zeraf and Badingilo Game Reserves), which have low conservation status (Table 4). Akagera National Park contains a major swamp system and has moderate conservation status, but is threatened by the Akagera basin development project. Moyowosi Game Reserve also contains major floodplain and swamp systems.

Table 5 outlines the exceptionally outstanding international importance of the small number of very large conservation areas (i.e., 20,000 sq km), viz., Boma and Southern National Parks (Sudan), the Serengeti-Mara ecosystem (Tanzania/Kenya), Savao National Park–Mkomazi-Umba Game Reserves (Kenya/Tanzania), Solous Game Reserve (Tanzania), and Ruaha National Park–Rungwa-Kizigo Game Reserves (Tanzania). These areas are also of outstanding importance for other large herbivores, e.g., elephant, black rhinoceros, zebra, giraffe, hippopotamus, and/or buffalo, and for large carnivores, in accordance with island biogeographical, genetic, and ecological considerations (Soule et al. 1979; East 1981a, b, 1983; Soule & Simberloff 1986). In the long term, continued evolution of antelopes by natural selection may be confined to very large conservation areas which preserve the full spectrum of competitive herbivore species and natural predators (Frankel & Soule 1981).

### National and International Conservation Priorities

Care must be taken in reconciling national interests with a regional or continental overview such as that sought here. The aim of allocating scores to individual conservation areas in Table 3 is to assist the identification of areas of such exceptional importance that their conservation assumes very high international priority. It must not be inferred that areas which are given moderate or low scores are unimportant. The very small (2 sq km) Saiwa Swamp National Park, for example, inevitably receives a much lower score than larger conservation areas with diverse antelope communities (Table 3). Nevertheless, this national park contains an isolated population of more than 100 sittatungas, which is probably the last viable population of this species in Kenya. Hence Saiwa Swamp National Park is of major national importance for antelope conservation.

In practice, national conservation objectives are of primary importance, since long-term conservation of antelopes depends on the commitment by individual countries to wildlife conservation, and the actions of national wildlife management agencies. All the areas listed in Table 3 are of major national importance for antelope conservation. All of these areas are also of international significance, since conservation of genetic material requires the survival of each species in as wide a range of its habitats as possible.
<table>
<thead>
<tr>
<th>Conservation Status:</th>
<th>1*</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>SUDANIAN REGIONAL CENTRE OF ENDEMMISM</td>
<td>Kiddepo Valley NP</td>
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<td>Boma NP</td>
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<td>Gash-seitit WR</td>
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<td>Serengti NP-Maswa GR-Ngorongoro CA Tsavo NP Meru NP-Rahole NR-Kora NR Masai Mara NR Samburu-Istolo NR-Shaba NR Amboseli NP Mkomazi-Umba GR Sihilo NP</td>
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<td>Olmro NP-Tana WR-Mago NP Tarangire NP Ruaha NP-Rungwa-Kizigo GR Awash NP-Awash W. WR-Alledeghi WR Harrai Elephant Sanctuary Lack Badana NP Yangudi Rassa NP Gewanc WR-Mille-sardo WR</td>
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<td>Bangaig GR</td>
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<td>LAKE VICTORIA REGIONAL MOSAIC</td>
<td>Bushland/Grassland, Woodland: Queen Elizabeth NP-Kigezi GR-Kibale Corridor GR-Kyambura GR Murchison Falls NP Karuma GR-Bugungu GR Akagera NP-Mutara HR</td>
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<td></td>
<td>Biharamulo Burigi GR</td>
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<td></td>
<td>Forest: Kibale FR Queen Elizabeth NP-Kigezi GR (Mara magambo Forest)</td>
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<td></td>
<td>Bwamba (Semiliki) FR Maramagamo-Kalinzu FR &amp; Kasyoha-Kitomi FR Bugoma FR Kakamega Forest NP-Nandi FR</td>
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<tr>
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<td>Ruaha NP-Rungwa-Kizigo GR</td>
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<td>Ugalia GR</td>
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*1: high; 2: moderate-high; 3: low-moderate; 4: nil-low; see Table 3.
Chapter 14: Regional Action Plan for Antelope Conservation

Action for antelope conservation can be considered separately at two discrete, equally important operational levels: political and government action, and field action. The latter involves two types of activity: surveys to identify conservation needs of specific taxa or antelope communities, and improvement of the management and protection of existing and proposed conservation areas.

1. Political and Government Action

Top-level approaches by the Director-General of IUCN are appropriate in the following cases, as opportunities permit:

1.1 Establishment of Conservation Areas in Somalia

The Somali region’s unique arid-adapted fauna includes several endemic antelopes (beera, dibatag, Piacentina’s dikdik, Speke’s gazelle, Pelzeln’s gazelle). The combined effects of uncontrolled hunting and extensive habitat degradation caused by overgrazing and drought have severely reduced Somalia’s wildlife. Viable remnants of most antelope species persist in scattered localities in the northern mountains, inland plateaux and coastal plains, the central coast and coastal hinterland, the lower Shabelle and Juba Rivers, and the southern tip of the country. Establishment of an effective system of conservation areas in Somalia in the near future is essential to prevent the decline of the country’s unique antelope fauna from culminating in the extinction of many species. This would represent a tragic loss of a valuable natural resource which could be of major importance to Somalia’s future development. International encouragement and support could play a vital role in assisting the development of the Somalia Government’s wildlife conservation and management programme, under the auspices of the National Range Agency. IUCN should actively explore the possibility of supporting ecological studies and conservation of Somali antelopes.

1.2 Establishment of Arid and Semi-arid Conservation Areas in the Sudan

There are no conservation areas in the desert, arid steppe and dry savanna which cover the northern half of the Sudan. This area is an internationally important habitat for arid-zone gazelles, with five species occurring. Conservation areas may be impractical in much of the remote, sparsely populated northern Sudan, where wildlife is scattered widely at very low population densities. The Red Sea Hills and Jebel Marra are among the few places in this region where it is feasible to establish wildlife conservation areas. This is most likely to be achieved by a political commitment by the Sudanese Government to the establishment of conservation areas in the north of the country.

1.3 Development of National Conservation Strategies

National Conservation Strategies for the integrated development and conservation of natural life-support processes, upon which the survival of both man and wildlife depend, should receive high priority. The educational value of preparing such policies may be as important as the final documents. Uganda was the only country in East and Northeast Africa in which preparation of a National Conservation Strategy was fully under way by mid-1986. Kenya is initiating the development of a National Conservation Strategy.

Antelope conservation will be achieved most effectively if it is part of an overall environmental conservation plan that includes other key aspects of natural ecosystems, such as significant topographical, geological, and hydrological features, flora, and other fauna (e.g., elephants, primates, large carnivores), and is integrated with environmentally sound development programmes that improve the quality of human life. There is a need to minimise conflicts between conservation and development by integrating decisions at the policy-making level. Forging closer links between conservation and development projects is therefore an important objective (Lusigi 1984).

1.4 Regional Cooperation in Wildlife Conservation

IUCN should continue to promote inter-governmental cooperation between national agencies responsible for the conservation and management of antelope populations which move across international boundaries. The most outstanding example is the Serengeti-Mara ecosystem, where the migratory populations of
2. Field Action: Surveys

2.1 Duikers and Other Forest Antelopes

Forest antelopes in general and duikers (Cephalophus spp.) in particular are the least-known African antelopes scientifically, yet they are an important source of meat and other useful products such as hides in many countries. Extensive field surveys of forest duikers and their habitats are essential in East and Northeast Africa, as in other regions of the continent, to clarify the taxonomy, distribution and conservation status of this important group of antelopes. Particular aspects requiring investigation in East and Northeast Africa include the taxonomy of the various “red” duikers (C. adersi, harveyi, natalensis, nigrifrons, weynsi, and related forms), the precise distribution of each species, particularly those whose survival is believed to be under threat (e.g., Aders’ yellow-backed and Abbott’s duikers), and identification of the most important conservation areas for forest duikers in the region. Little precise information is available about the current status of forest antelopes (duiker, bushbuck, and in a few cases, e.g., South West Mau, bongo) in such areas as Kakamega Forest National Park, Mount Elgon National Park and South West Mau Nature Reserve (Kenya), Kiliimanjaro, Mahari and Uzungwa Mountains (proposed) National Parks (Tanzania), and Maramagambo and some other forests of western Uganda. As well as identification of key areas, improved conservation of forest antelopes will require a much closer association between forestry and wildlife conservation (Parker 1986a).

2.2 Arid-zone Antelopes

Surveys are required to determine the current distribution and status of arid-zone antelopes in those parts of the northern Sudan (dama, Soemmerring’s, dorcas, slender-horned and/or red-fronted gazelles) and Somalia (beira, dibatag, Soemmerring’s, Pelzeln’s and/or Speke’s gazelles) where it may be feasible to establish protected areas. The little-known Dahal gazelle from Kebr Island in the Dahlan archipelago, Ethiopia, also requires investigation.

3. Field Action: Management of Conservation Areas

This section outlines the needs of key existing and proposed protected areas for antelope conservation in the major biogeographic divisions of East and Northeast Africa. MacKinnon & MacKinnon (1986) provide an overview of general conservation requirements in each of these biogeographic units.

3.1 Sudanian Regional Centre of Endemism

The southeastern parts of this unit, in the southern Sudan, support some of the region’s most abundant and diverse antelope communities.

3.1.1 Southern Sudan: Boma National Park, Southern National Park, Badingilo Game Reserve, Zeraf Game Reserve and surrounding areas

The future of the spectacular antelope populations of this vast, inaccessible region will depend on conservation programmes proceeding sufficiently rapidly to counteract the threats posed by such factors as increasing human and cattle populations, developments such as exploitation of the substantial oil reserves on the Nile floodplain, and increased poaching. The legal basis for wildlife conservation in the southern Sudan is well established. Much remains to be done in the field to overcome the massive logistical and socio-economic problems that confront conservation programmes in this region. Some conservation areas have been developed and managed to some extent, with game scout outposts, boundary outlines, and tracks established. Others exist only on paper or have not yet been gazetted.

Improvement of the conservation status of the proposed Boma National Park assumes especially high priority in antelope conservation. The Boma ecosystem contains enormous migratory populations of white-eared kob and other species which rival those of the Serengeti. Southern National Park, Badingilo and Zeraf Game Reserves also have high priority for conservation action. Boma, Badingilo and Zeraf contain major floodplain and/or swamp systems with unique antelope communities, including forms endemic to the region such as Nile lecheh, white-eared kob and Mongalla gazelle.

Political unrest and armed conflict have seriously hindered the development of conservation programmes in the southern Sudan. This should not preclude the resumption of international assistance when conditions allow. Large-scale poaching of antelopes for meat often occurs during periods of political instability, but antelope populations generally suffer much less severely than more commercially valuable wildlife species such as elephant and rhinoceros. The example of Uganda’s national parks illustrates the value of rapid resumption of international assistance when circumstances permit.

3.1.2 Western Ethiopia: Gambella National Park, Yoh and Gash-setit Wildlife Reserves

Gambella National Park (proposed) contains a major eastward extension of the swamps and floodplains of the southern Sudan, with similar species such as white-eared kob and Nile lecheh. Yob and Gash-setit Wildlife Reserves are situated close to the Sahel regional transition zone, in which they are included by MacKinnon & MacKinnon (1986); the bushland of this area on the northwestern Ethiopia/Sudan border has a characteristic antelope fauna, including unique forms such as the hartebeest and Heuglin’s gazelle. This area has been affected severely by drought in recent years. Re-establishment of these reserves, if feasible, is of international significance for antelope conservation.

3.1.3 Northern Uganda: Kidapo Valley National Park

Maintenance of the relatively high conservation status of this national park, which includes significant populations of characteristic Sudanian antelopes such as lelwel hartebeest, is of international significance.

3.2 Somalia-Masai Regional Centre of Endemism

This biogeographic unit is situated entirely within East and Northeast Africa. It contains a great diversity of antelopes, including endemic arid-adapted forms in the semi-desert of Somalia and Ethiopia, and exceptionally abundant populations of alcelaphines, gazelles, and other antelopes in the less arid bushland and grassland of southern Kenya and northern Tanzania.
3.2.1 Tanzania: Serengeti National Park–Maswa Game Reserve–Ngorongoro Conservation Area, Tarangire National Park, Ruaha National Park–Rungwa and Kizigo Game Reserves, Mkomaizi-Umbo Game Reserves

The Serengeti and Tarangire areas in northern Tanzania have especially high biological importance for antelope conservation, but moderate conservation status. The migratory populations of wildebeest, Thomson’s gazelle and other species in the Serengeti and Tarangire ecosystems spend considerable periods of the year outside the national parks. In the case of Serengeti, increased resources are urgently required to improve anti-poaching patrols, provide effective boundary demarcation, and prevent human encroachment in Maswa Game Reserve and Ngorongoro Conservation Area adjacent to the national park. In Tarangire, extensions to the conservation area are essential to protect vital wet-season dispersal areas and migration routes of antelopes and other wildlife which are threatened by human encroachment and agricultural development.

The Ruaha and Mkomaizi areas also contain major antelope communities and require increased conservation action. Poaching pressures are substantial in Ruaha. Mkomaizi, which is contiguous with Kenya’s Tsavo West National Park, is threatened by human encroachment.


Maintenance of the relatively high conservation status of Kenya’s major protected areas for savanna and bushland antelopes is a high international priority. Tsavo National Park contains Africa’s largest protected populations of several antelope species adapted to semi-arid habitats, including lesser kudu, gerenuk and fringe-eared oryx. Much of Tsavo National Park is well protected, but the recent invasion of a substantial area of western Tsavo by large herds of cattle poses a major threat to this park’s future. Meru, Samburu and Sibiloi are also of major importance for the conservation of antelope communities of semi-arid and arid habitats.

The Masai Mara reserve protects much of the dry season range of the migratory populations of wildebeest and other ungulates in the Serengeti-Mara. It also supports large resident populations of other antelope species characteristic of *Acacia* savannas and grasslands. The relatively small Amboseli and Nairobi National Parks are primarily important for protecting the dry season ranges of migratory species.


The major conservation areas in the arid and semi-arid Ethiopian lowlands contain internationally significant antelope communities. The lower Omo and Mago valleys contain Ethiopia’s greatest diversity of antelope species. The antelope communities of the Awash, Harrar, and Yangudi Rassa (Danakil) areas in the eastern lowlands include species not represented in the protected areas of southern Ethiopia and northern Kenya, such as Sommerring’s and dorcas gazelles.

Improvement of the current low to moderate conservation status of Ethiopia’s major lowland conservation areas is an important priority. This requires increased international assistance to build on the progress already made in developing the infrastructure and management of these areas, e.g., by strengthening the existing ranger forces to obtain more effective control of invasion by local pastoralists and their livestock, illegal tree-felling, and poaching.

The small (56 sq km) Senkelle Hartebeest Sanctuary in a densely populated part of Ethiopia’s Rift Valley is of vital importance for the survival of Swayne’s hartebeest. Despite severely limited resources, the Ethiopian Wildlife Conservation Organisation has done a remarkable job of protecting this antelope in Senkelle, where the population increased from 4–500 in the early 1970s to about 1700 (two-thirds of the world population) in 1984. Finance is urgently required to maintain and improve this protection. Action required includes fencing the boundary between the sanctuary and the neighboring state farm to prevent continued deforestation of trees and grass by people and their livestock within the sanctuary, prevent hartebeest damage to crops on the neighboring farm, and maintain respect for the sanctuary and its wildlife among local people. There may also be a need to translocate animals from the Senkelle population to suitable protected habitat elsewhere.

3.2.4 Sudan: Boma National Park

In addition to its major populations of floodplain and *Combretum* woodland antelopes characteristic of the Sudanian regional centre of endemism, the proposed Boma National Park contains an extensive area of *Acacia* thornbush in its southern sector. This bushland supports important populations of characteristic Somalia-Masai antelopes such as beisa oryx and Grant’s gazelle.

3.3 Africa montane Archipelago-like Regional Centre of Endemism

Montane forests are under pressure from overexploitation and destruction throughout eastern Africa. In most cases they comprise islands of natural habitat surrounded by medium to high density agricultural communities. Protection of the surviving remnants of natural montane vegetation is essential for watershed conservation, as well as for the preservation of unique biota. The areas listed here represent only a few of the more outstanding examples of threatened montane ecosystems. More information is required to clarify antelope conservation priorities; in particular, little is known about the precise status of forest duikers in many areas.

3.3.1 Kenya: Aberdares National Park and Forest Reserve, Mount Kenya National Park and Forest Reserve, Mount Elgon National Park

Kenya’s mountain parks and contiguous forest reserves are key established areas for antelope communities of montane forest, bamboo, and moorland. Maintenance and improvement of the conservation status of these areas is a high international priority.

3.3.2 Tanzania: Kilimanjaro National Park and Game Reserve, Uzungwa Mountains National Park, Ngorongoro Conservation Area

These protected areas contain important antelope communities, including the only effectively protected populations of the little-known Abbott’s duiker (Kilimanjaro and Uzungwa). The Crater Highlands of Ngorongoro Conservation Area contain significant upland antelope communities and form a vital catchment area, providing the water that sustains the rich farming districts of Oldeani and Karatu, as well as the wildlife populations of the Ngorongoro Crater floor and Lake Manyara National Park in the adjacent Rift Valley. There is a need to reinforce existing conservation measures in these areas to counteract human encroachment, illegal tree-felling, and poaching.
3.3.3 Ethiopia: Bale Mountains National Park

This national park contains the only effectively protected population of the endemic mountain nyala. Other antelopes present in substantial numbers include bushbuck, grey duiker, bohor reedbuck and klipspringer. Effective protection against hunting and exclusion of domestic livestock by the Ethiopian Wildlife Conservation Organisation over the last 15 years has allowed a marked increase in the mountain nyala population in the extreme north of the park, near the park headquarters. There is a need for increased resources to allow greater protection of higher altitude areas within the park, and to consolidate the recent extension of the park to include more optimum mountain nyala habitat at lower altitudes. The only known forest duiker population in Ethiopia was recently discovered in this park.

3.4 Guinea-Congolia/Sudania Regional Transition Zone

The small part of this zone which lies within the East and Northeast African region, in the southwestern Sudan, supports major antelope populations.

3.4.1 Sudan: Bangangai Game Reserve and surrounding area

The 4600 sq km of moist lowland forest and forest-savanna mosaic in southwestern Sudan is of high international importance for wildlife conservation. It contains abundant forest antelope populations, including one of Africa's largest populations of bongo, but is threatened by agricultural and forestry development. The existing Bangangai Game Reserve (170 sq km) and two other very small game reserves are not large enough to protect a representative portion of this important part of Sudan's natural environment. Urgent action is required to ensure that Bangangai Game Reserve is not engulfed by the needs of the increasing human population around it. This should include a substantial increase in the size of the reserve, maintenance of an effective Wildlife Department presence, clear delineation of the reserve's boundaries, improved cooperation with the Forestry Department in management of the reserve, more effective fire management, adequate control of hunting, and establishment of international cooperation with the relevant Zairean wildlife authority concerning activities on the reserve's Zaire border.

3.5 Lake Victoria Regional Mosaic

The bushland-grassland, woodland and low-medium altitude forests of this unit are entirely within the East and Northeast African region, apart from a small area in eastern Zaire. The unit's antelope fauna includes savanna species such as defassa waterbuck, Uganda kob, topi and oribi, and forest species such as bushbuck, blue and Weys' duikers. Dense human settlement has largely confined antelopes and other wildlife to conservation areas.

3.5.1 Rwanda: Akagera National Park–Makabola Hunting Reserve

Akagera National Park and the contiguous reserve contain a major remnant Lake Victoria/Nile basin savanna antelope community. Rwanda's success to date in maintaining this park's integrity represents an outstanding achievement for a small developing country with one of Africa's highest human population densities, and deserves continued international support.

3.5.2 Uganda: Murchison Falls National Park–Karuma Game Reserve–Bugungu Game Reserve, Queen Elizabeth National Park–Kigezi Game Reserve–Kibale Corridor Game Reserve–Kyambura Game Reserve

Uganda's two largest national parks and the contiguous game reserves contain internationally important remnants of the antelope communities characteristic of the moist savannas of the Lake Victoria basin. All of the antelope species represented in these parks survived the poaching epidemic of the 1970s in sufficiently large populations to regain their former numbers with the resumption of effective protection. Continued international support for Uganda's efforts to consolidate the rebuilding of the infrastructure of these parks and to contain poaching remains a high priority.

3.5.3 Western Uganda Forests: Queen Elizabeth National Park–Kigezi Game Reserve (Maramagambo Forest), Kibale Forest Reserve, Maramagambo-Kalinzu Forest Reserve, Kasyooha-Kitomi Forest Reserve, Bwamba (Semiliki) Forest Reserve

The remaining fragments of the formerly extensive forest relics of the Lake Victoria basin contain forest antelope communities of major regional importance. These forests and their wildlife are threatened by excessive logging, human encroachment, and heavy hunting pressures. Increased conservation action is an essential immediate requirement to reverse this trend and prevent the irrevocable loss of most of Uganda's remaining natural forests. The Maramagambo Forest, which is partly within Queen Elizabeth National Park and partly within Kigezi Game Reserve, is still relatively undisturbed, but illegal tree-felling and poaching of forest ungulates are severe problems in the adjacent Maramagambo-Kalinzu and Kasyooha-Kitomi Forest Reserves. Bwamba Forest Reserve, an easterly extension of the Ituri Forest in the Zaire basin, also has outstanding value for forest antelope conservation but is seriously affected by human encroachment. The Kibale Forest Project has successfully developed and maintained a relatively high conservation status in that forest. There is a need to expand the techniques developed at Kibale to other forests in western Uganda. Further information is required on the current status of duikers and other forest antelopes in some of these areas; other Ugandan forest reserves such as Bugoma and Budongo may be equally important for the conservation of Lake Victoria basin forest antelope communities.

3.5.4 Southwestern Kenya: Kakamega Forest National Park–National Reserve

Enhancement of the conservation status of these relic Lake Victoria basin forests is of international significance in forest antelope conservation.

3.5.5 Northwestern Tanzania: Biharamulo-Burigi Game Reserves

This area supports an internationally significant savanna antelope community in an area on Lake Victoria with magnificent scenery, but its conservation status is low.

3.6 Lanzhar-Inhambane Regional Mosaic

This coastal belt of relatively moist habitats extends from southern Somalia to southern Mozambique; slightly less than half of it is within the East and Northeast African region. The relatively high human population density and widespread cultivation have reduced natural habitats to scattered remnants. Effective conservation areas are essential for the long-term survival of antelopes in this unit. There are a few proposed or existing conservation areas within the unit in Somalia and Mozambique; most are in Kenya and Tanzania.

3.6.1 Kenya: Boni-Dodori National Reserves, Aravale National Reserve, Sokoke–Arumoko Forest Reserve, Tana River National Reserve, Shimba Hills National Reserve

Boni-Dodori National Reserves (and the proposed Lack Bada National Park in adjacent Somalia) contain a distinctive antelope community of international significance, including major populations of Harvey's red duiker, coastal topi, and Haggard's oribi. There is an urgent need to upgrade the conservation
status of these reserves, which are threatened by human activities such as excessive tree-felling for charcoal and firewood.

Effective protection of Arawale National Reserve is vital for the long-term survival of the hirola. This species is restricted to a narrow strip of grassy plains lying between waterless thornbush and the coastal strip in eastern Kenya and adjacent Somalia. The hirola is threatened by development of the cattle industry within its narrow range, and apparently suffered a marked population decline during the 1984 drought. Arawale National Reserve is situated in one of the species' two main concentration areas.

Sokoke-Arahiiko Forest Reserve contains one of the few remaining habitats of Aders' duiker and other antelopes of Kenya's coastal forests. It is threatened by excessive tree-felling and pressure from adjacent settlements for forest products such as building poles and firewood. There is a need to enlarge the existing 43 sq km nature reserve within the forest reserve, and to set aside a surrounding buffer zone of at least 200 sq km for traditional utilisation only. These actions would be a major step towards securing the future of this internationally important forest and its unique wildlife.

Tana River and Shimba Hills National Reserves also contain important coastal antelope populations but have inadequate conservation status. The Shimba Hills contain the last viable population in Kenya of the northeastern form of sable (Hippotragus niger rousevelti). This population is insecure because the reserve is managed for forestry rather than wildlife conservation, with pine trees planted on the sable’s grassland habitat and logging of the reserve’s patches of indigenous forest. There is an urgent need to implement effective wildlife management practices in the Shimba Hills National Reserve, including controlled rotational burning of the sable’s habitat and anti-poaching patrols.

3.6.2 Tanzania: Selous Game Reserve, Jozani Forest Reserve (Zanzibar Island)

Part of the eastern sector of the vast Selous Game Reserve in southern Tanzania contains the largest protected area of the Zanzibar-Inhambane regional mosaic. The forest/grassland mosaic of this part of the eastern Selous supports important populations of characteristic coastal antelopes such as bushbuck, Natal red duiker, and suni. Enhancement of the conservation status of both this sector and the more extensive Zambeziian zone of the Selous Game Reserve is a high priority in international antelope conservation.

The forests and thickets of eastern Zanzibar’s coral rag country support internationally significant populations of Aders’ duiker, blue duiker and suni. There are no areas on Zanzibar set aside specifically for the conservation of wildlife. Four forest reserves exist but are not managed for wildlife conservation. Upgrading of Jozani Forest Reserve and the surrounding thickets to a national park, including Mapopwe forest as its buffer zone, would be an important step towards securing the future of Zanzibar’s wildlife. There is also a need to establish a Wildlife Section under the control of the Forestry Department, review existing wildlife legislation, and improve enforcement of conservation laws on Zanzibar.

3.7 Zambeziian Regional Centre of Endemism

The northeastern part of this extensive unit is in southern and western Tanzania, which contains some of the unit’s most important wildlife populations.

3.7.1 Tanzania: Selous Game Reserve, Ruaha National Park-Rungwa and Kizigo Game Reserves, Moyosowoi Game Reserve, Ugalia Game Reserve. Kilombero Valley

More effective control of poaching is urgently required in the Selous Game Reserve, which contains a major community of Brachystegia woodland antelopes, including Africa’s largest populations of sable and Lichtenstein’s hartebeest and large populations of other species such as common eland, greater kudu, Nyassa wildebeest and impala. Reinforcement of existing conservation measures in Ruaha National Park and the contiguous game reserves is also a high priority. The Ruaha area, which is situated on the ecotone between Acacia savanna/thornbush and Brachystegia woodland, contains a major antelope community including large populations of typical Zambeziian species such as common eland, greater kudu, waterbuck, roan, sable and Lichtenstein’s hartebeest. Both Selous and Ruaha-Rungwa-Kizigo are of great international importance for antelope conservation.

Moyosowoi also contains extensive floodplains and swamps with major populations of topi, sitatunga and other species. Achievement of higher conservation status for these two reserves is an important priority. The Kilombero Valley floodplain supports the world’s largest population of puku (estimated to number 43 600 in 1986). Effective conservation of this population is essential for the puku’s long-term survival within the region. This could be achieved by the establishment of a game reserve in the uninhabited parts of the Kilombero Valley, which also contains large populations of buffalo, sable, Lichtenstein’s hartebeest, and other wildlife.

3.8 Priorities for International Assistance

Among 27 current (1986/87) site or country-specific approved World Wildlife Fund projects in East and Northeast Africa, three are in the Sudan, two in Ethiopia, one in Djibouti, one in Somalia, four in Uganda, seven in Kenya, and nine in Tanzania. These projects do not all relate directly to antelopes, but they include assistance to several areas of high priority for antelope conservation, e.g., Serengeti, Masai Mara, Selous, Kilimanjaro, Uzungwa and Bale Mountains, Murchison Falls and Kibale. Other funding sources also support conservation projects in the region, e.g., bilateral assistance from Belgium to Akagera National Park, Rwanda.

The process by which conservation projects are developed and receive international funding is often complex and lengthy. This process must take account of political realities and countries’ records in wildlife conservation. As well as maintaining a high level of support for countries with relatively well developed conservation programmes, e.g., Kenya and Tanzania, it is important for antelope conservation that support is strengthened to countries which have received little international support in the past but are making a substantial commitment to the development of their conservation areas, e.g., Ethiopia (Ashine 1984).

4. Captive Breeding

As an insurance against extinction, it is desirable to establish secure, self-maintaining captive breeding populations of antelopes whose survival in the wild is precarious. This may allow subsequent re-establishment of natural populations. Only a few species whose survival is under threat in East and Northeast Africa are represented by substantial captive populations in European and North American zoos, e.g., bongo, Nile lechwe, dama and slender-horned gazelles, and possibly Speke’s gazelle. In the case of other species (and highly distinctive subspecies), particularly those under immediate threat, capture of individuals from the wild is required, where feasible. This would assist the establishment of sufficiently large breeding populations of antelopes which already exist in captivity in small numbers, e.g., hirola, and provide a nucleus population of those which do not, e.g., Abbott’s, Aders’ and Ruwenzori black-fronted duikers, dibatag,
tor Hartbecest and Huglin's gazelle. IUCN should support specific initiatives to establish sound captive breeding programmes for these antelopes.

5. Strategies for Antelope Conservation

5.1 The Goal

The broad objectives and requirements of the conservation of natural ecosystems in Africa are well documented (e.g., Cumming 1984; Lusigi 1984; MacKinnon & MacKinnon 1986). As part of overall environmental conservation, the goal of international antelope conservation (see chapter 1) should incorporate the maintenance in perpetuity of selected examples of the full range of African ecosystems which include major antelope communities. This will require a minimum set of properly managed and protected national parks of international significance, which can be used as the foundation for a network of diverse types of protected areas at the national level to further the maintenance of life support systems and sustainable development (Cumming 1984).

5.2 The Problem

The most critical issue confronting the long-term survival prospects of antelopes and other wildlife in Africa is the continent's rapid, unabated human population growth. Kenya's annual rate of population increase, for example, is among the highest in the world at 4.1%. This means that Africa will change markedly in the next 30 to 50 years, regardless of the success of attempts to reduce the human birth rate.

Attempts to conserve wildlife by establishing strictly protected conservation areas without active consultation with local communities may be successful in the short term, but this approach results in escalating conflicts between people and wildlife, especially on reserve boundaries. Most conservation areas will be engulfed sooner or later by the rising tide of humanity unless the requirements of local people and wildlife can be reconciled. Essentially, this requires compromise between the aesthetic ideals of conservationists and the shorter-term economic motives of rural people (Bell 1986a). There needs to be less emphasis on guns and paramilitary personnel to enforce conservation laws, and greater emphasis on the creation and enhancement of public support for wildlife conservation (Bosie 1986).

In many cases, this will require direct participation of local people in conservation decisions and some utilisation of natural resources within protected areas, preferably in buffer zones around core areas of high conservation priority. Conservation cannot be expected to compete successfully on economic terms with other forms of land use, since conservation and short-term economic interests are fundamentally in conflict (Bell 1986a). From a conservation viewpoint, the maxim that wildlife must pay its way or be eliminated is false, as it renders conservation areas vulnerable to any alternative form of land use which is more profitable (Eltringham 1984; Bell & Clarke 1986). Nevertheless, local communities (as well as central governments) must benefit materially from wildlife conservation, at least in the short term, if it is to succeed. National conservation agencies must attempt to reconcile their objectives with short-term economic interests, and encourage generation of material benefits for local rural people by any means that do not conflict with conservation goals (Bell & Clarke 1986).

5.3 Options for Antelope Conservation

5.3.1 Strict Protection

There will remain a central core of high priority areas, such as some of those of outstanding international importance for the conservation of antelope communities, where little compromise with short-term economic motives is possible if conservation goals are to be attained (Bell 1986a). Strict protection and effective management will be necessary in these core areas. Improved techniques of monitoring and law enforcement by game scouts are vital if Africa's wildlife resources are to be conserved efficiently, and in a manner which is responsive to the needs of rural people (Bell 1986b; Chinzenga 1986). There is a significant body of opinion that African wildlife will only survive in the long term within strictly protected conservation areas (e.g., Parker 1984; Spinage 1986).

Public consent and support for conservation are essential if strictly protected core conservation areas are to persist in the long term. Education and sociological research on conservation issues are therefore just as important as improved methods of enforcing conservation laws. Conservation education has a vital role to play in promoting more positive attitudes to wildlife and greater awareness of the benefits of conservation. Continued international financial support for education programmes, such as the Wildlife Clubs now operating in schools in Kenya and Uganda, is therefore an important priority. As well as educating the school population, it is important to increase the conservation awareness of today's leaders and decision-makers (Sefu 1986).

There is also a need for much higher priority to be given to sociological aspects of wildlife conservation research, e.g., monitoring of public attitudes (Bell 1986c). As Eltringham (1984) and others have pointed out, conservation research has concentrated on the biology of plants and animals, but sociological research is equally important to provide the means of reconciling the needs of people and wildlife.

Conservation education and public relations programmes are likely to require skilled and dedicated effort by conservationists over a long period to achieve increased public support for strictly protected conservation areas. Carefully controlled consumptive uses of wildlife and other natural resources within conservation areas and/or their buffer zones may have more immediate success in promoting positive attitudes to wildlife conservation among rural populations (e.g., Bosie 1986; Mphande 1986; Nzima 1986). The remainder of section 5.3 briefly reviews options for revenue-generating/consumptive use of antelope populations as part of conservation programmes.

5.3.2 Tourism

Tourism (game watching, sport hunting) has an important role to play in economic utilisation of wildlife. Some countries in East and Northeast Africa, notably Kenya, have established major wildlife-based tourist industries which are important earners of foreign exchange. In some cases, e.g., Masai Mara and Samburu-Ngutane National Reserves in Kenya, local councils benefit directly from the proceeds of gate-takings for entry to the reserves, which can assist the promotion of positive attitudes to conservation among local people. Intensive tourism also has detrimental aspects, such as ecological damage through excessive off-road driving and disturbance of wildlife, and the creation of urban sprawls around tourist lodges within conservation areas. In addition, over-reliance on revenues from tourism as the economic justification for wildlife conservation is a precarious policy. International tourism is highly vulnerable to such factors as economic recession and political instability.

5.3.3 Sustained-yield Utilisation

The major value of antelopes to rural people is as sources of meat and other products, such as hides. A range of options is available for utilising antelope populations, from intensively managed game farming to harvesting antelopes' natural productivity in unmanaged ecosystems. There is a need to develop methods which achieve successful utilisation and conservation.
5.3.3.1 Game Farming

Sustained-yield utilisation of antelopes for meat and hides has been developed successfully on commercial farms in southern Africa (e.g., Zimbabwe, South Africa) and on some ranches in Kenya. This has often been conducted in conjunction with cattle ranching, and other forms of wildlife utilisation such as sport hunting. It has involved ranch owners rather than the peasant economy sector (Martín 1986a).

Successful game farming requires highly developed skills in animal production techniques. The levels of tameness in ungulates and extent to which ecosystems must be managed (e.g., elimination of predators, reduction of herbivore species diversity) to achieve efficient animal production negate the concept of conservation of natural, unmodified communities and ecosystems (Parker 1986b).

5.3.3.2 Game Cropping

The potentially high productivity of wild African ungulates has encouraged numerous attempts at cropping, i.e., sustained-yield harvesting of wild animals in natural ecosystems to provide continuous supplies of meat, hides and other products. The economic success rate of these attempts has been very low (see reviews by Eltringham (1984) and Parker (1986b)).

Major difficulties encountered in attempts to crop wild antelopes include problems of harvesting (e.g., inability to crop the quota because of such factors as increased wariness and erratic dispersal of animals, flooded or rocky terrain restricting vehicle access), processing (e.g., the need to meet expensive hygiene requirements to gain access to major urban markets), and marketing (e.g., low prices compared to meat from domestic animals and hence low returns for game meat, opposition from the domestic animal-based meat trade, opposition from conservation organisations opposed in principle to game cropping). Other problems include determining the legal ownership of antelopes on communal lands, determining offtake quotas, especially in multispecies situations (Bell 1986b), and stimulation of commercial poaching by game cropping which creates a market for game meat which poachers can exploit. Game cropping is a logistically complex operation which requires substantial plant and equipment and exacting organisation (e.g., Mphande & Jamsana 1986); in many cases the economic returns may be insufficient to justify substantial capital investment (Eltringham 1984).

5.3.3.3 Subsistence Hunting

Hunting by rural people is the simplest and most economically efficient form of wildlife utilisation in natural African ecosystems (Eltringham 1984; Bell 1986c; Parker 1986b). Its widespread success, e.g., as poaching within conservation areas, reflects the skills of the practitioners, their use of appropriate technology, and low overhead costs. Systems which utilise the efficiency of poaching to meet conservation objectives may offer the best prospect of successfully integrating wildlife utilisation and conservation. Eltringham (1984) suggested a system of government-licensed traditional village hunters harvesting surplus wildlife populations outside core conservation areas (national parks), to provide meat for local consumption. Bell (1986c) suggested recognising poaching as a legitimate form of land use, under the control of law enforcement by field patrols of game scouts. Bell's suggested scheme emphasizes poaching of commercially valuable wildlife products, notably ivory, but includes antelope meat and hides surplus to local requirements. A central feature of this scheme is the conservation authority becoming the major buyer of ivory and other commercial poaching products, thus enabling it to control poaching offtake to achieve conservation management objectives. The direction of poaching revenue into priority rural areas would assist their transition to self-sustained land use which reduces or eliminates their reliance on wildlife resources, and hence reduces the conflict between conservation and rural people (Bell 1986c).

There may be alternative methods to hunting for utilising the productivity of antelopes in natural ecosystems, e.g., juvenile capture and fattening for slaughter. Wild antelopes can adapt rapidly to captive conditions and become amenable to daily herding (e.g., King et al. 1977).

5.3.4 Multiple Resource Use

One route to ecologically sound rural development may be the implementation of multiple resource use systems which zone conservation areas and adjacent lands for types of use that integrate conservation needs with those of local human populations (Ferrar 1983). A combination of various strategies may be required within an area, ranging from controlled utilisation of wildlife and natural habitats (e.g., hunting for meat, exploitation of plant resources such as collection of thatching grass and firewood, and livestock grazing), to non-consumptive management of core areas which are protected as ecological benchmarks.

The optimum combination of land use systems will be specific to each area, according to local socio-economic and ecological conditions. Montane habitats, for example, are often surrounded by high density agricultural communities. The peripheral parts of montane conservation areas may have to serve as buffer zones between human populations and core areas of protected natural habitat. The Aberdares National Park in Kenya is effectively buffered in this way by the surrounding zone of forest reserves. In savanna ecosystems such as the Serengeti-Mara in Tanzania and Kenya, antelope and other wildlife populations roam freely between conservation areas and adjacent land. Competition with local human populations is becoming more severe as human and livestock numbers increase, and migratory wildebeest reduce the available grazing and transmit livestock diseases. Neighbouring agricultural tribes are exerting increasingly heavy poaching pressure on wildebeest and other ungulates in the western and northwestern Serengeti. An appropriate solution may be to establish a buffer zone under the control of neighbouring tribes, wherein game can be harvested under a supervised quota system. The limitation of both wildebeest and cattle numbers may be necessary to minimise competition for grazing (Ferrar 1983).

It is much easier to propose solutions than to implement them, but recent advances in the development of multiple resource use in some African countries, e.g., Zimbabwe (Martin 1986b), illustrate the potential of this type of approach. Application of multiple resource use in response to the needs of local people will require a thorough review of the status and role of conservation areas throughout Africa. Many existing national parks and reserves, especially those of only local significance, could probably incorporate some degree of consumptive use of wildlife and natural habitats that has hitherto been denied or, in many cases, proceeded on a de facto basis, through poaching and illegal grazing. In practice, limited consumptive use of wildlife will not be easy to achieve, because of the difficulties of setting sustainable offtake quotas and regulating exploitation.

Some conservation areas may have to contract in size in the face of expanding human land needs. This could be accommodated by zoning deproclaimed areas for some form of exploitative multiple resource use. This would help retain a value for the core protected area as a supply zone for the resources used (e.g., nucleus antelope populations for subsistence hunting in surrounding zones), as well as serving as a buffer between core areas and human settlement. In other cases, multiple resource use may entail development of wildlife utilisation schemes on surrounding land, with conservation areas retained intact as core areas. There is an urgent requirement for conservationists to adopt a positive, ag-
gressive attitude to the export of ecological understanding and zoning for multiple resource use beyond the borders of protected areas (Ferrar 1983). This would promote the integration of wildlife management with the needs of local human communities.

5.4 Conclusions

The most appropriate and feasible strategy for antelope conservation among the range of options available will depend on local circumstances and opportunities. Consumptive utilisation of antelopes by rural populations is likely to play a large part in successful wildlife conservation. There is a need for a detailed, scientific and pragmatic review of wildlife utilisation which identifies the factors likely to produce successful utilisation and conservation of natural ecosystems, framed in a way which provides useful guidelines to African government departments responsible for the management of wildlife resources. Such a review should be sponsored by an international organisation, e.g., IUCN, and should involve relevant specialist groups of the Species Survival Commission, e.g., the Antelope, African Elephant and Rhino Specialist Groups. Conservation education and research on the sociological aspects of wildlife-human conflicts are also important aspects of antelope conservation and are high priority areas for international funding.

Most antelope species in East and Northeast Africa still occur in substantial populations, at least locally. Antelopes remain widespread in moderate to large numbers in extensive areas of the region. Long-term persistence of these populations will depend on the extent to which governments and land development agencies adopt ecologically based programmes for human development which achieve sustainable patterns of land use. In its role as a scientific advisory group, the Antelope Specialist Group should continue to monitor the status of antelopes, highlight problems of antelope conservation, recommend practical solutions, and monitor the success of attempts to integrate wildlife conservation with development.

References


APPENDIX 1: ANTELOPE INVENTORY REPORT FORM

1. Species/Subspecies/Population:
2. Country:
3. Date:
4. Reporter:
   Name:
   Address:
5. Distribution (To save words, include a distribution map):
   Present:
   Former:
6. Population:
   Estimated numbers in the wild (if counts or samples have been made, summarize data).
   Are numbers increasing, decreasing or stable?
7. Field Studies:
   Has the species/subspecies/population been studied in the country in question?
   If yes, by whom; please cite publications or reports under 13. References.
8. Habitat, Food and Reproduction:
   a) Brief description of habitat and food preferences.
   b) Any data on average group size and dispersion pattern.
   c) Movements—e.g., migratory/nomadic, wet-season dispersion, dry-season aggregation, or sedentary.
   d) Reproduction—times of calving, mating (including peaks if any).
9. Status:
   Is the status of the animal:
   a) presently satisfactory?
   b) threatened, and if so why, e.g., habitat destruction, over-exploitation, hybridization, natural disasters, competition for food, or other causes.
10. Conservation Measures Taken:
    Legal measures (international conventions, national laws).
    To what extent are laws enforced?
    Protected areas—does it occur in national parks, reserves, etc.? If so, please name. Does it also occur outside?
    Have any specific conservation/management plans been proposed or implemented?
11. Conservation Measures Proposed:
    What is required to conserve the population(s) in question?
12. Additional Remarks:
13. References:
    Published papers, unpublished reports, manuscripts, written (in litt.) or verbal communication (pers. comm.).

APPENDIX 2: ANTELOPES UNDER THREAT IN EAST AND NORTHEAST AFRICA

This summary divides antelopes whose survival is under threat in East and Northeast Africa into:

species and highly distinct subspecies which are confined to the region;

species which occur widely elsewhere in Africa but are represented by internationally significant populations within the region; and

species which occur only marginally in the region.

Within each of the first two of these groupings, antelopes are divided further into those which are under immediate threat (currently in danger of extinction throughout the region, or likely to become in danger of extinction in the near future if the causal factors continue to operate), and those which are potentially at risk (i.e., antelopes which have a very restricted distribution and/or inadequate representation in conservation areas, but whose survival in the region is not under immediate threat). All of the few antelope species which occur marginally in East and Northeast Africa are in danger of extinction within the region.

Endemic Antelopes Under Immediate Threat

Aders' Duiker (Cephalophus adersi)

Known only from coastal forest and thicket on the Kenya coast (Sokoke-Arabuko Forest Reserve) and Zanzibar Island, Aders' duiker is threatened by habitat destruction and overhunting. Numbers in Sokoke-Arabuko are unknown but probably decreasing; on Zanzibar, the population is about 5000 and declining. Stricter control of poaching and more effective protection of its known habitats are essential to ensure this duiker's survival. This should include enlargement of the existing nature reserve within Sokoke-Arabuko Forest Reserve and establishment of a surrounding buffer zone of at least 200 sq km within which only traditional utilisation is permitted, and establishment of a national park or game reserve within the existing forest reserves on Zanzibar Island which is managed for wildlife conservation. Surveys are required to determine whether this duiker occurs elsewhere, e.g., on the northern Tanzanian coast. Its precise taxonomic relationship to related forms such as C. harveyi and C. natalensis also requires clarification. No specimens are known to be held in captivity.

Ruwenzori Black-fronted Duiker (Cephalophus nigrifrons rubidus)

This duiker is confined to the montane bamboo and heath of the Ruwenzori Mountains on the Zaire border in western Uganda. Detailed observations of fresh specimens are necessary to determine its taxonomic status. It is distinct from the form of C. nigrifrons which occurs at lower altitudes on the Ruwenzoris, and may be a separate species. Heavy hunting pressure threatens its survival. Effective protection of the Ruwenzori Mountains Forest Reserve is necessary to prevent its imminent extinction. There are no specimens in captivity.

Abbott's Duiker (Cephalophus spadix)

This relic species is known only from isolated montane forests in Tanzania, where it is threatened by poaching, and by habitat destruction caused by legal and illegal logging and human encroachment. Its numbers are unknown. The establishment and maintenance of effective protection for the populations which occur in Kilimanjaro National Park and Game Reserve and the proposed Uzungwa Mountains National Park would represent a major advance in the conservation of this species. Most of its populations will still occur outside national parks, mainly in forest...
There is a need for a greater awareness of this species among Tanzania's conservationists and managers of forest and game reserves; effective conservation of a specific animal in logged forests cannot take place in ignorance. No specimens are known to be held in captivity.

**Tora Hartebeest (Alcelaphus buselaphus tora)**

A distinctive race of the common hartebeest which occurs only in the savanna grasslands of the border region of the eastern Sudan and northwestern Ethiopia, this antelope is under severe threat from uncontrolled hunting, loss of habitat to agricultural development, and habitat degradation resulting from the combined effects of drought and overgrazing by domestic livestock. Much of its range was devastated by severe drought in the early 1980s; this region is also affected by political instability and armed conflict. The tora hartebeest formerly occurred in Dinder National Park in the eastern Sudan, but disappeared from this park before 1960. In Ethiopia, it may still occur in Chire, Gash-setit and Yob Wildlife Reserves, but the conservation status of these reserves is low. Effective protection and management of these reserves and/or capture of sufficient individuals to establish a breeding population in captivity are necessary to prevent this hartebeest's extinction.

**Hirola (Dumalis cus hunteri)**

The hirola is confined to a narrow strip of grassy plains lying between waterless thornbush and coastal forest-savanna mosaic in a small area of Kenya's coastal hinterland and adjacent Somalia. The population has declined markedly since the mid-1970s, when numbers were estimated to be 12,500 in Kenya and 1,200 to 2,000 in Somalia. In Kenya it is threatened by competition from livestock for forage and water, and development of the cattle industry within its restricted range. These threats were compounded by the 1984 drought, which appears to have reduced the Kenyan population by more than 80%. In Somalia, it has been eliminated from most of its former range by uncontrolled hunting. There is an urgent need to improve the level of protection and management in Kenya's Arawale National Reserve, which is situated in one of the hirola's two major concentration areas, and to establish a protected area in the Lake Dere region, which contains the only sizable population remaining in Somalia. A small population has become established in Kenya's Tsavo National Park, south of the species' natural range, following introduction in the 1960s. Small numbers of hirola exist in captivity; establishment of a viable captive breeding population is desirable to ensure this species' survival.

**Dibatag (Ammodorcas clarkei)**

A unique species of the arid thornbush of the Horn of Africa, the dibatag has suffered severely from poaching, drought and overgrazing by domestic livestock. No conservation areas have been established within this antelope's range (northern and central Somalia, and the eastern lowlands of Ethiopia). Local concentrations of dibatag may still occur in the coastal hinterland of central Somalia, and in the Ogaden region of Ethiopia. Surveys are necessary to identify sites where it is feasible to establish conservation areas for this species and other large mammals of the region; effective protection of such areas is an urgent requirement. Establishment of secure captive breeding populations of dibatag and other unique species of the Somali region, e.g., beira, may be essential to ensure their survival.

**Heuglin's Gazelle (Gazella rufifrons tilonura)**

Separated by the Nile from other forms of *G. rufifrons*, Heuglin's gazelle is the most distinctive race of this species. It occurs in the same region along the eastern Sudan/northwestern Ethiopia border as the tora hartebeest, and suffers from similar threats. Unlike the tora hartebeest, Heuglin's gazelle still occurs in Dinder National Park in the eastern Sudan, but this park is severely threatened by agricultural development of the surrounding areas, poaching, and invasion by large herds of domestic livestock. Heuglin's gazelle also occurs in Gash-setit, Naka and Yob Wildlife Reserves in Ethiopia; improved protection of these reserves may be vital to this gazelle's survival.

**Beira (Dorcotragus megalotis)**

The beira has a very patchy distribution on arid stony hillsides in northern Somalia, including the Marmar Mountains in the Ethiopia/Somalia/Djibouti border area. Its survival is threatened by habitat degradation caused by overgrazing and drought, and uncontrolled hunting. It does not occur in any protected areas. Surveys of potential areas for the conservation of this species and effective protection of such areas are required urgently. A captive breeding population of 10 beiras has been established at Al-Wabru, near Doha, in Qatar (C. P. Groves, *in litt.* 19 March 1987).

**Endemic Antelopes Potentially at Risk**

**Mountain Nyla (Tragelaphus baxteri)**

This species is confined to the eastern highlands of Ethiopia, where the total population is approximately 2,000. Effective protection in the Bale Mountains National Park over the last 15 years has enabled the population in this park to increase to 1,000; the park has recently been extended to incorporate additional optimum mountain nyla habitat. Elsewhere in its very restricted range the mountain nyla is threatened by habitat destruction and hunting. There is a need to establish a second conservation area, e.g., in the Assi or Harerghe Mountains.

**White-eared Kob (Kobus kob leucotis)**

Highly distinctive in coloration and social organisation from other forms of *K. kob*, the white-eared race is confined to the southern Sudan, east of the Nile, and a small area of southwestern Ethiopia. The total population exceeds one million, including spectacular migratory concentrations which rival those of the Serengeti-Mara wildlife in Tanzania and Kenya. The white-eared kob is potentially threatened by competition with livestock for scarce forage during the dry season, and loss of habitat to exploitation of the oil reserves of the Nile floodplain. Poaching with modern weapons is also a potential threat; traditional hunting of white-eared kob provides an important source of protein for local people and does not threaten the migratory populations. Political unrest and armed conflict have seriously hindered the development of conservation programmes in the southern Sudan. When conditions allow, resumption of international assistance to existing and proposed conservation areas with major populations of white-eared kobs and other floodplain antelopes, e.g., the Roma National Park, Badinglo and Zeraf Game Reserves, should be given very high priority.

**Nile Lechwe (Kobus megaceros)**

This species is largely confined to the Sudd swamps in the southern Sudan, with a small outlying population in the Machar-Gambella marshes of the southeastern Sudan and southwestern Ethiopia. Total numbers are estimated to be about 30,000. The inaccessibility of the vast Sudd swamps (about one-third within Zeraf Game Reserve) provides considerable protection against hunting. The Nile lechwe is one of many unique species of wildlife which are largely or entirely confined to the Sudd swamps. While these swamps are under no immediate threat, they could be affected detrimentally by developments such as the Jonglei Canal in the future.
Hybrid Kenya Hartbeest (*Alcelaphus buselaphus cokes × lelwel*)

Various hybrids between Coke’s and lelwel hartbeest formerly occurred widely in western Kenya. They have been eliminated from most of their former range by loss of habitat to agricultural development. These hybrid forms are now confined to the Lambwe Valley in southwestern Kenya and to Laikipia and parts of adjacent districts in west-central Kenya. The total population is about 5–10,000. Populations of hybrid hartbeest are protected in Meru National Park (locally common) and Lambwe Valley National Park (about 100).

**Swayne’s Hartbeest (*Alcelaphus buselaphus swaynei*)**

This hartbeest was formerly abundant in southwestern Somalia and the Rift Valley of Ethiopia. It was exterminated in Somalia before 1930 by uncontrolled hunting, and has been reduced to isolated remnant populations (total numbers about 2–3000) within various conservation areas in Ethiopia’s Rift Valley, e.g., Seukelle Hartbeest Sanctuary, Netchisar National Park, Awash National Park (reintroduced), and Yavello Wildlife Reserve. The small (56 sq km) Senkelle Sanctuary, which is situated in a densely settled area, is especially important for this antelope’s survival. Effective protection by the Ethiopian Wildlife Conservation Organization enabled the population in Senkelle to increase from 4–500 in the early 1970s to about 1700 in 1984. Financial support to consolidate the protection and management of this sanctuary and its hartbeest population is a high priority in international antelope conservation.

**Coastal Topi (*Damaliscus lunatus topi*)**

Geographically isolated from other subspecies of *D. lunatus*, the coastal topi remains abundant within its restricted range in northern coastal Kenya, including the coastal hinterland (Kenyan population estimated to number >80,000 prior to the 1984 drought). Its numbers and range have been reduced greatly in adjacent southern Somalia, where it still occurs locally in moderate numbers (e.g., in pockets on floodplain grasslands of the lower Shebelle River) but is threatened by poaching and loss of habitat to agricultural development. More effective protection and management of the reserves in which it occurs (Boni-Dodori and Tana River National Reserves, Kenya, and the proposed Lack Badana National Park, Somalia) are necessary to ensure its long-term survival.

**Pelzeln’s Gazelle (*Gazella dorcas pelzelni*)**

This easternmost race of the dorcas gazelle is confined to a narrow strip of coastal desert on the northern edge of the Horn of Africa. There are no protected areas within its range in northern Somalia and Djibouti. Although it has suffered from excessive hunting and habitat deterioration caused by overgrazing by domestic livestock, its adaptation to arid conditions has probably enabled it to survive better than most other antelopes in northern Somalia. It remains relatively widespread and common in Djibouti. Effective protection within conservation areas would enhance its prospects for long-term survival.

**Mongalla Gazelle (*Gazella thomsonii albonotata*)**

This northern race of Thomson’s gazelle is abundant within its restricted range in floodplain and savanna grasslands in the southern Sudan east of the Nile (population estimated to be about 300,000). It also occurs in small numbers in southwestern Ethiopia. In the long term, effective protection and management of the conservation areas in which it occurs, notably Boma National Park (proposed) and Badingilo Game Reserve (Sudan), and Omo National Park (Ethiopia), may be important for its survival.

Speke’s Gazelle (*Gazella spekei*)

One of several unique antelopes of the arid Horn of Africa, Speke’s gazelle is confined to northern and central Somalia and adjacent eastern Ethiopia (where there is only one definite record). It still occupies much of its range in northern Somalia and the central coastal region, but its numbers have been reduced considerably by poaching, drought, and overgrazing of its arid grassland habitat by domestic livestock. Establishment of effective conservation areas within its range is necessary to ensure its survival.

Soemerring’s Gazelle (*Gazella soemmerringii*)

Soemerring’s gazelle still occurs locally within its range in the arid and semi-arid bushland and semi-desert of the northeastern Sudan, the northern, eastern and southeastern Ethiopian lowlands, Djibouti, and Somalia. It has also been recorded in northern Kenya near the Ethiopian border. Throughout most of its range it has suffered from decades of uncontrolled hunting with firearms and severe habitat degradation caused by man and his domestic livestock, accentuated by recent droughts. These factors have reduced this formerly abundant gazelle to scattered, remnant populations and threaten its long-term survival. It occurs in very few or even moderately protected conservation areas; improved protection and management of Awash (where it is common) and Yangudi-Rassa National Parks in Ethiopia are of major importance for the conservation of this gazelle. Surveys are required to determine the status of the little-known dwarf race of this species which occurs on Kebr Island in Ethiopia’s Dahlac archipelago, within the proposed Dahlac Marine National Park.

Piacentini’s Dikdik (*Madoqua piacentinii*)

This dikdik has a very restricted range in central coastal Somalia. While it is under no immediate threat, it is hunted with nets and there are no protected areas within its range. Like most of the other antelopes of Somalia, its prospects for long-term survival would be enhanced by the establishment of effective conservation areas which protect viable populations.

Haggard’s Oribi (*Ourebia ourebi haggardii*)

An isolated and highly distinctive race, this oribi is confined to northern coastal Kenya and southern Somalia (a similar range to the coastal topi). Human encroachment on to its habitat and poaching are long-term threats to its survival. It would benefit from more effective protection of Kenya’s Boni-Dodori National Reserves and Somalia’s proposed Lack Badana National Park.

**Widespread Species Under Immediate Threat Within the Region**

**Slender-horned Gazelle (*Gazella leptoceros*) and Dama Gazelle (*G. dama*)**

Within East and Northeast Africa, these two gazelles are confined to the northwestern Sudan, where their survival is threatened by uncontrolled hunting and habitat destruction caused by overgrazing and drought. Little is known about their current distribution and status in the Sudan. Surveys should be conducted to investigate the possibility of providing more effective protection for these two species in the northwestern Sudan. The establishment of conservation areas may not be feasible in these remote border areas, where wildlife is widely scattered at very low population densities. Both species are well represented in captivity.
Widespread Species Potentially at Risk Within the Region

Giant Eland (Tragelaphus derbianus)

The regional population of giant eland, which occurs in the southern Sudan to the west of the Nile, is of major international importance. Estimated to number 18,000 in the late 1970s, it is one of the largest populations of this species remaining in Africa, rivaled only by the population in the Central African Republic. The giant eland is in no immediate danger in the Sudan, but is potentially threatened by poaching and rinderpest. Improvement of the conservation status of Southern National Park and the other protected areas within which it occurs in the southern Sudan are important priorities in the long-term conservation of this species.

Bongo (Tragelaphus eurycerus)

Internationally significant populations of this large forest antelope occur in two separate regions of East and Northeast Africa: moist lowland forest and forest-savanna mosaic in the southwestern Sudan (population about 2000), and isolated montane forests in Kenya (population at least several hundred). It is potentially at risk because of its small numbers within the region, but its status is satisfactory at present. There is a need to enlarge the existing Bangangai Game Reserve (170 sq km) in the southwestern Sudan to make it large enough to protect viable populations of bongo and other forest biota, and to improve its protection and management to ensure that it is not engulfed by the needs of the increasing human population in the surrounding area. Maintenance and improvement of the current levels of protection in Kenya's montane conservation areas where bongo occur, especially Aberdares National Park and Forest Reserve and South West Mau Nature Reserve, are also of major international importance for the conservation of this species.

Black-fronted Duiker (Cephalophus nigrifrons)

In East and Northeast Africa, this duiker is confined to isolated areas of montane forest, bamboo and heath. Much of its range is within conservation areas, such as Bwindi, Mount Elgon and Ruwenzori Forest Reserves in Uganda, Mount Kenya and Mount Elgon National Parks in Kenya, Volcanoes National Park and Nyungwe Forest Reserve in Rwanda, and Kibira National Park in Burundi. Its survival in the region is dependent on the maintenance of effective protection against poaching and habitat destruction in areas such as Bwindi Forest Reserve, Mount Kenya, Mount Elgon and Volcanoes National Parks, and improved protection elsewhere.

Yellow-backed Duiker (Cephalophus silvicultrus)

Not uncommon in the lowland forests of the southwestern Sudan, where it faces similar long-term threats as the bongo. Elsewhere in East and Northeast Africa it is restricted to very localized areas of medium to high altitude forest, e.g., Bwindi Forest Reserve and Maramagambo Forest in Uganda, and South West Mau Nature Reserve in Kenya. Heavy poaching pressure has greatly depleted this species in western Uganda and may have exterminated it in Rwanda.

Mountain Reedbuck (Redunca fulvorufa)

Confined to limited areas of suitable habitat on grassy hillsides, mountain slopes, and broken, rocky country in the southeastern Sudan, Ethiopia, northeastern Uganda, southern Kenya and northern Tanzania. Poaching and the expansion of agriculture on hillsides and mountain slopes threaten its survival outside well-protected conservation areas. It occurs in moderate numbers in several protected areas, such as Awash National Park (Ethiopia), Aberdares and Tsavo National Parks (Kenya), Kilimanjaro National Park and Ngorongoro Conservation Area (Tanzania). Effective protection and management of these areas are important for this species' survival.

Puku (Kobus vardoni)

Within the region this species occurs only in the floodplain grasslands of the Lake Rukwa and Kilombero Valleys in southern Tanzania. The Lake Rukwa population has been affected adversely by flooding of its habitat caused by a prolonged rise in the lake's level since the mid-1960s, and by poaching and expanding settlement. The Kilombero Valley contains Africa's largest population of puku, which appears to have increased over the last decade and was estimated to number 43,600 in 1986. Establishment of a game reserve in the uninhabited parts of the Kilombero Valley would be of major international importance for the conservation of this species.

Red-fronted Gazelle (Gazella rufifrons)

In addition to the subspecies G. r. tilonura (see above), this species occurs widely in moderate numbers west of the Nile in the central Sudan. It survives precariously in the face of poaching and habitat destruction by excessive numbers of domestic livestock. There is a need to establish secure conservation areas within its Sudanese range, e.g., on the upper slopes of Jebel Marra.

Sharpe's Gryshok (Raphicerus sharpei)

Within the region, Sharpe's gryshok occurs locally in scattered areas with low thicket or secondary growth in western and southern Tanzania, where it is not often seen and little is known about its status. Its survival within the region may be threatened by the expansion of settlement and hunting, but it occurs in the southern part of the Selous Game Reserve and in Ugalla Game Reserve. Until more is known about this species' distribution and status in Tanzania, little more can be done to conserve it.

Species Which Occur Marginally Within the Region

Scaimitar-horned Oryx (Oryx dammah) and Addax (Addax nasomaculatus)

These two species were formerly common in the northwestern Sudan, but uncontrolled hunting has reduced their numbers to the point where they are either on the verge of extinction or already extinct in this region. Vagrants may still occasionally enter the Sudan from Chad.

Bay Duiker (Cephalophus dorsiatis), White-bellied Duiker (C. leucogaster) and Bates' Pigmy Antelope (Neotragus batesi)

These three species formerly reached the eastern limits of their continental distributions in isolated localities within the lowland forests of western Uganda. The two duikers are almost certainly extinct in Uganda. Bates' pigmy antelope may persist in a few Ugandan forests, where it is very rare.