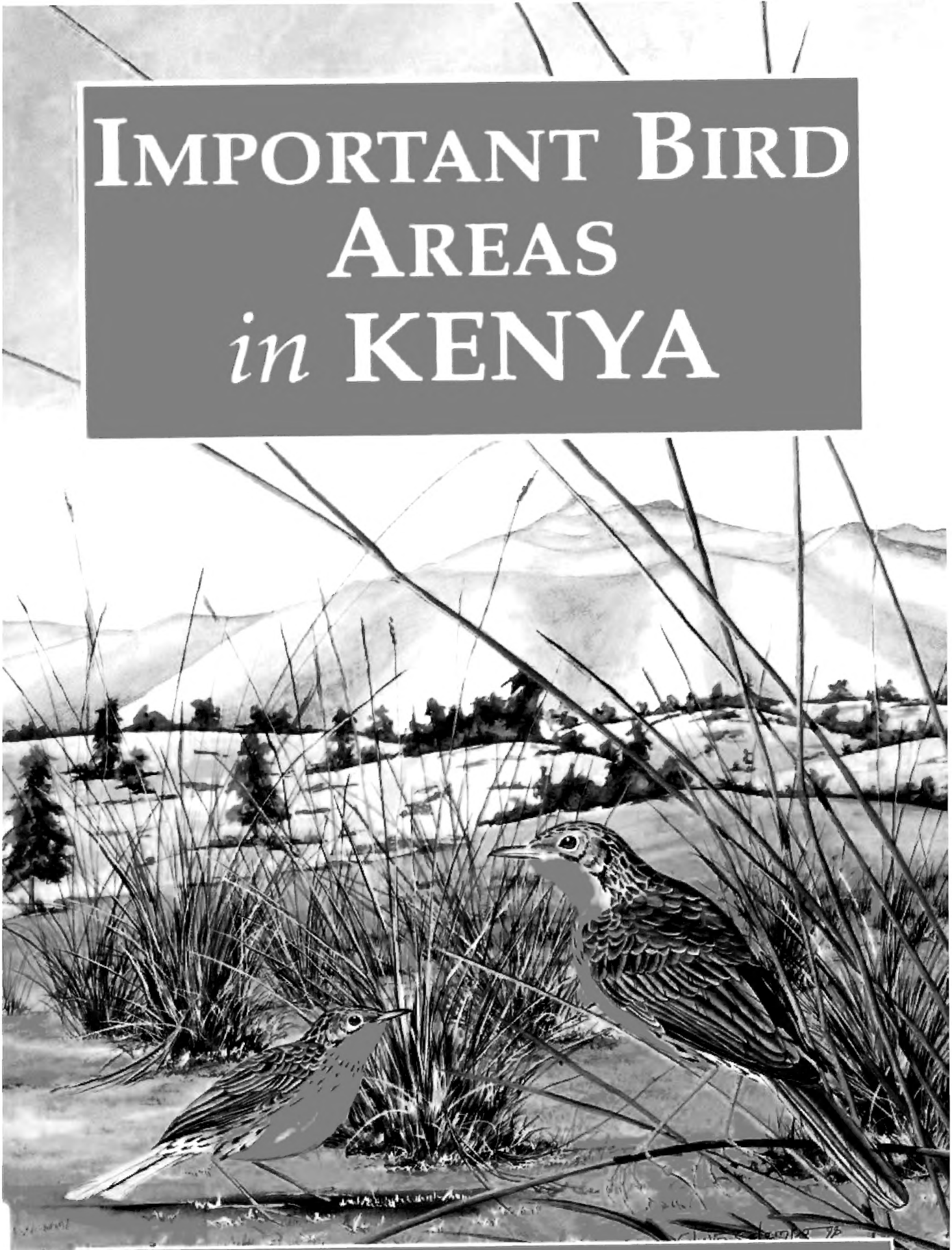
Important Bird Areas *in* Kenya



Leon Bennun and Peter Njoroge

BirdLife International

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Important Bird Areas in Kenya

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Grey-crested Helmet-shrike

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Ornithology Department
National Museums of Kenya

A joint project of

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in the Kinangop Grasslands IBA, by Edwin Selempo.

Dedicated to

the late Minnie Gatahi
who worked with unwavering
commitment for conservation.

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1 SUMMARY

This directory is a contribution to identifying Kenya's biodiversity conservation priorities. It presents the results of a three-year study to select and compile information on Important Bird Areas (IBAs) in Kenya. The Important Bird Areas process uses birds to locate key sites for conservation across the globe. Birds have many advantages as a group to use for biodiversity priority setting. They are widespread, diverse and easily surveyed. Above all, we know much more about them than about other organisms.

IBAs are sites of global biodiversity conservation importance that are chosen using internationally agreed, objective, quantitative and scientifically defensible criteria. IBAs are selected because they hold bird species that are threatened with extinction, have highly restricted distributions, or are characteristic of particular biomes. Sites holding exceptionally large numbers of congregatory birds also qualify.

Sixty sites have been identified as IBAs in Kenya (Table 1, Map 1 and section 4.2). Sufficient information is lacking for a further five sites, which are designated as potential IBAs (section 4.3). Thirty-five of the 60 IBAs are already within the national protected areas system; the remainder are unprotected. The IBA network covers all Kenya's major habitats and around 10% of its land area (section 3.3.7). Together, the 60 IBAs conserve all the bird species for which Kenya has global responsibility.

All IBAs are, by definition, priorities for conservation, but some need more urgent attention than others. A detailed analysis of threats and biological importance was undertaken within the set of 60 IBAs, to set priorities for action (section 3.6.1). Sites are classified into critical, urgent and high priority, and appropriate conservation actions suggested for each category (section 3.6.4).

Detailed information on each site (location, area, altitude, status, description, key birds, other wildlife and conservation issues) is given in the site accounts that form the bulk of this book (section 4). Some important findings include:

(1) The current protected area system has at least two **major gaps**:

- The unique **highland grasslands** on either side of the central Rift Valley, on the plateaux of Kinangop (IBA 4) and Mau Narok (IBA 32). These are home to the endemic Sharpe's Longclaw *Macronyx sharpei*, among other specialised grassland species. These grasslands are being cleared and converted remarkably fast, and the grassland fauna and flora are under very severe threat.
- The **papyrus swamps** around Lake Victoria – Dunga (IBA 37), Koguta (IBA 38), Kusa (IBA 39), Sio Port (IBA 60) and especially Yala (IBA 41). These contain a unique set of papyrus endemic birds, including the globally threatened Papyrus Yellow Warbler *Chloropeta gracilirostris*. They are also of crucial ecological importance as water filters, and fish nurseries and refuges (Yala Swamp contains endemic fish species that have apparently become extinct in the main lake). With increasing human pressure on these swamps, they are being burned, harvested unsustainably, and cleared for cultivation. Despite poor performance of the existing 'reclamation' scheme there, large parts of Yala Swamp are earmarked for drainage and conversion.

  All these sites are heavily used by local communities (and in the case of the highland grassland, are almost entirely private land). Imaginative conservation strategies are required to protect these valuable habitats and their biodiversity.

(2) One IBA, **Dakatcha Woodland** (IBA 8), lies on presently unadjudicated land in Malindi District. Because of its biodiversity value, it should be gazetted as a Forest Reserve or other protected area in the ongoing adjudication exercise.

(3) Although 91% of the 22 forest IBAs are protected areas, 77% of these sites are severely or critically threatened. There are **severe general problems in forest management** that must be tackled if biodiversity is not to be lost.

  Forest IBAs that are classed as 'Critical' for conservation action include:

- Montane forests on **Mt Kenya** (IBA 5), **Mt Elgon** (IBA 59) and the **Aberdare Mountains** (IBA 1). These magnificent forests are important for threatened and biome-restricted birds, as well as

Table 1
IBAs in Kenya: location, categories, area, protected status and main habitats

Site code	Site names	Province	District	Class	IBA Categories
1	Aberdare Mountains	Central	Murang'a, Nyandarua, Nyeri	HF	TRB
2	Kianyaga Valleys	Central	Kirinyaga	O	TR
3	Kikuyu Escarpment Forest	Central	Kiambu	HF	TRB
4	Kinangop Grasslands	Central/Rift Valley	Nyandarua/Nakuru	HG	TR
5	Mt Kenya	Central/Eastern	Embu, Kirinyaga, Nyeri, Laikipia/Meru, Tharaka-Nithi, Nyambene	HF	TRB
6	Mukurweini Valleys	Central	Nyeri	O	TR
7	Arabuko-Sokoke Forest	Coast	Kilifi, Malindi	CF	TRB
8	Dakatcha Woodland	Coast	Kilifi	CF	TR
9	Diani Forest	Coast	Kwale	CF	T
10	Dzombo Hill Forest	Coast	Kwale	CF	TR
11	Gede Ruins National Monument	Coast	Malindi	CF	T
12	Kaya Gandini	Coast	Kwale	CF	TR
13	Kaya Waa	Coast	Kwale	CF	T
14	Kisite Island	Coast	Kwale	W	C
15	Kiunga Marine National Reserve	Coast	Lamu	W	C
16	Mida Creek, Whale Island & Malindi/Watamu Coast	Coast	Malindi	W	C
17	Marenji Forest	Coast	Kwale	CF	TRB
18	Mrima Hill Forest	Coast	Kwale	CF	TB
19	Sabaki River Mouth	Coast	Malindi	W	C
20	Shimba Hills	Coast	Kwale	CF	TRB
21	Taita Hills Forests	Coast	Taita-Taveta	EAF	TRB
22	Tana River Delta	Coast	Tana River	W	TBC
23	Tana River Forests	Coast	Tana River	CF	TRB
24	Tsavo East National Park	Coast/Eastern	Tana River, Taita-Taveta/Kitui	S	TB
25	Tsavo West National Park	Coast	Taita-Taveta	S	TB
26	Chyulu Hills Forests	Eastern/Rift Valley	Makueni/Kajiado	HF	TR
27	Dida Galgalu Desert	Eastern	Marsabit	S	TRB
28	Lake Turkana	Eastern/Rift Valley	Marsabit/Turkana	W	BC
29	Machakos Valleys	Eastern	Machakos	S	TR
30	Masinga Reservoir	Eastern	Embu	W	C
31	Meru National Park	Eastern	Meru, Tharaka-Nithi	S	B

Codes

Class:
CF, coastal forests; EAF, Eastern Arc forests; HF, highland forests; HG, highland grassland; O, other habitats; P, papyrus swamps; S, savannah; W, wetlands; WF, western forests; WG, western grasslands.

Category:
T, globally-threatened species; R, restricted-range species; B, biome-restricted species; C, congregations.

PA, protected-area status:
N, entirely or largely outside protected area (National Park, National Reserve or Forest Reserve).
Y, entirely or largely within a protected area.

* area approximate

Area (ha)	PA	Main habitats	Site code	Site names
179,900	Y	Montane forest, bamboo, montane grassland and moorland	1	Aberdare Mountains
*12,000	N	Steep river valleys, now mainly cultivated	2	Kianyaga Valleys
37,600	Y	Montane forest	3	Kikuyu Escarpment Forest
*77,000	N	Montane grassland, farmland	4	Kinangop Grasslands
271,000	Y	Montane forest, bamboo, montane grassland and moorland	5	Mt Kenya
*20,000	N	Steep river valleys, now mainly cultivated	6	Mukurweini Valleys
41,600	Y	Coastal evergreen forest and woodland	7	Arabuko-Sokoke Forest
32,000	N	Coastal woodland	8	Dakatcha Woodland
80	N	Deciduous coral-rag forest	9	Diani Forest
245	Y	Undifferentiated coastal mixed forest	10	Dzombo Hill Forest
44	Y	Coastal semi-deciduous forest	11	Gede Ruins National Monument
150	Y	Coastal deciduous *Cynometra-Terminalia* forest	12	Kaya Gandini
20	Y	Low coastal *Cynometra-Drupetes* forest on coral rag	13	Kaya Waa
1	Y	Coral rock, low scrub	14	Kisite Island
25,000	Y	Mangroves, coral islets and platforms, sandy beaches	15	Kiunga Marine National Reserve
26,100	Y	Intertidal rock, sand and mud, coral reefs, beds of sea-grass, coral platforms and islets, sandy beaches, mangrove forests	16	Mida Creek, Whale Island & Malindi/Watamu Coast
1,520	Y	Undifferentiated coastal mixed forest	17	Marenji Forest
250	Y	Undifferentiated coastal mixed forest	18	Mrima Hill Forest
*200	N	Estuarine sandbanks, mudbanks, dunes, freshwater pools	19	Sabaki River Mouth
21,740	Y	Coastal forest, grassland and scrub	20	Shimba Hills
400	Y	Moist montane forest	21	Taita Hills Forests
130,000	N	Fresh and brackish lakes and streams, freshwater and saline grasslands and wetlands, beaches and mudflats, successional stages of forest and woodland and dune ridges	22	Tana River Delta
*3,700	Y	Riparian evergreen forest, grassland, wooded grassland, bushland and deciduous woodland	23	Tana River Forests
1,175,000	Y	Bushland, bushed grassland, *Acacia-Commiphora* woodland, riverine scrub	24	Tsavo East National Park
906,500	Y	*Acacia-Commiphora* bushland, open grassy plains, riverine scrub	25	Tsavo West National Park
18,000	Y	Montane forest, rough grassland and thicket	26	Chyulu Hills Forests
undefined	N	Open black-lava desert	27	Dida Galgalu Desert
756,000	N	Chloro-carbonate alkaline lake surrounded by open sandy and rocky habitats	28	Lake Turkana
*5,000	N	Riverine bush and thicket, *Acacia xanthophloea* woodland	29	Machakos Valleys
*16,000	N	Freshwater reservoir, surrounded by open *Acacia-Commiphora* bushland	30	Masinga Reservoir
87,000	Y	Wooded grassland, *Acacia-Commiphora* bushland	31	Meru National Park

Table 1
IBAs in Kenya: location, categories, area, protected status and main habitats

Site code	Site names	Province	District	Class	IBA Categories
32	Mwea National Reserve	Eastern	Embu	S	TR
33	Samburu/Buffalo Springs National Reserves	Eastern/Rift Valley	Isiolo/Samburu	S	B
34	Shaba National Reserve	Eastern	Isiolo	S	TRB
35	Dandora Ponds	Nairobi	Nairobi	W	C
36	Nairobi National Park	Nairobi	Nairobi	HG	TRC
37	Dunga Swamp	Nyanza	Kisumu	P	TB
38	Koguta Swamp	Nyanza	Kisumu	P	TB
39	Kusa Swamp	Nyanza	Kisumu	P	TB
40	Ruma National Park	Nyanza	Suba	WG	T
41	Yala Swamp	Nyanza/Western	Siaya/Busia	P	TB
42	Amboseli National Park	Rift Valley	Kajiado	S	B
43	Cherangani Hills	Rift Valley	Elgeyo Marakwet, West Pokot	HF	B
44	Lake Baringo	Rift Valley	Baringo	S	B
45	Lake Bogoria National Reserve	Rift Valley	Koibatek, Baringo	W	TC
46	Lake Elmenteita	Rift Valley	Nakuru	W	TRC
47	Lake Magadi	Rift Valley	Kajiado	W	C
48	Lake Naivasha	Rift Valley	Nakuru	W	TRC
49	Lake Nakuru National Park	Rift Valley	Nakuru	W	TRC
50	Masai Mara	Rift Valley Rift Valley	Narok,Trans-Mara	HG	TR
51	Mau Forest Complex		Nakuru, Kericho, Narok, Bomet	HF	B
52	Mau Narok/Molo Grasslands	Rift Valley	Nakuru, Narok	HG	TR
53	North Nandi Forest	Rift Valley	Nandi	WF	TRB
54	Ol Donyo Sabache		Samburu	S	T
55	South Nandi Forest	Rift Valley	Nandi	WF	TB
56	South Nguruman	Rift Valley Rift Valley	Narok	S	TR
57	Busia Grasslands	Western	Busia	WG	TB
58	Kakamega Forest	Western	Kakamega	WF	TRB
59	Mt Elgon		Mt Elgon/Trans-Nzoia	HF	TRB
60	Sio Port Swamp	Western	Busia	P	TB

Summary

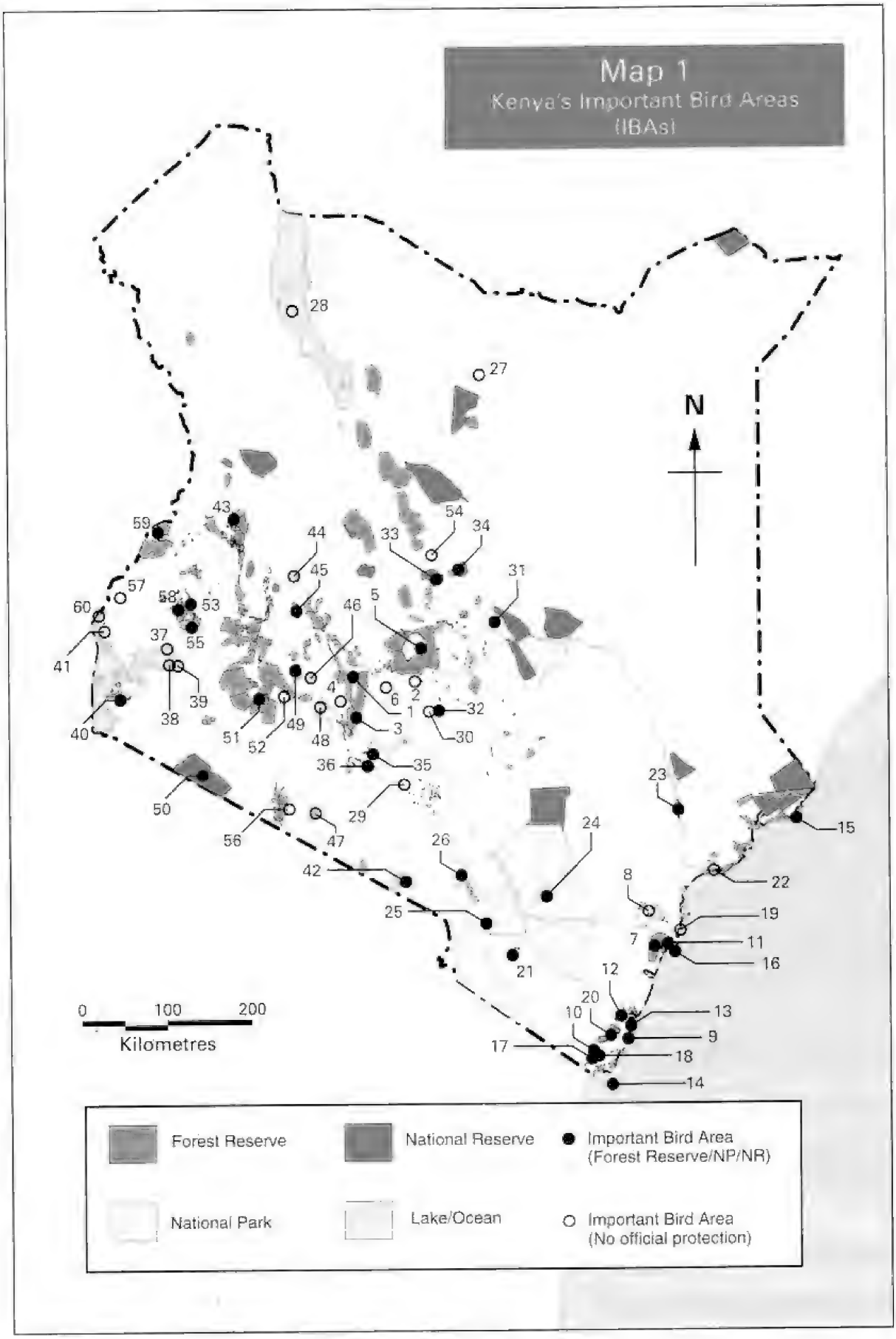
Class:
CF, coastal forests; EAF, Eastern Arc forests; HF, highland forests; HG, highland grassland; O, other habitats; P, papyrus swamps; S, savannah; W, wetlands; WF, western forests; WG, western grasslands.

Category:
T, globally-threatened species; R, restricted-range species; B, biome-restricted species; C, congregations.

PA, protected-area status:
N, entirely or largely outside Protected Area (National Park, National Reserve or Forest Reserve).
Y, entirely or largely within a protected area.

* area approximate

Area (ha)	PA	Main habitats	Site code	Site names
4,200	Y	Bushland and woodland with open glades	32	Mwea National Reserve
29,600	Y	Open bush and grassland, *Acacia tortilis* woodland, riverine woodland, rocky cliffs and scarps	33	Samburu/Buffalo Springs National Reserves
23,900	Y	Riverine woodland and thicket, woodland, *Commiphora* bushland, open lava desert, alkaline grasslands and swamps	34	Shaba National Reserve
300	N	Oxygenation ponds with mud or concrete banks and fringing vegetation	35	Dandora Ponds
11,700	Y	Grassland, riverine woodland, bush and thicket, man-made dams and ponds, upland dry forest	36	Nairobi National Park
*500	N	Papyrus swamp	37	Dunga Swamp
*1,800	N	Papyrus swamp	38	Koguta Swamp
*1,000	N	Papyrus swamp	39	Kusa Swamp
12,000	Y	Grassland, open woodland and thickets	40	Ruma National Park
8,000	N	Papyrus swamp and associated habitats	41	Yala Swamp
39,200	Y	*Acacia* woodland, open grassland, bushland and papyrus swamps	42	Amboseli National Park
95,600	Y	Montane forest, bamboo, scrub, grassland and moorland	43	Cherangani Hills
*28,400	N	Rocky cliffs, *Acacia* woodland and bushland surrounding shallow freshwater lake with swampy margins	44	Lake Baringo
10,700	Y	Alkaline lake, with fringing woodland and bushland	45	Lake Bogoria National Reserve
6,300	N	Alkaline lake, fringing *Acacia* woodland, *Tarchonanthus* bushland and grassland	46	Lake Elmenteita
10,500	N	Alkaline trona-covered lake, with fringing open bushland	47	Lake Magadi
23,600	N	Freshwater lake and fringing papyrus swamp and *Acacia xanthophloea* woodland	48	Lake Naivasha
18,800	Y	Alkaline lake with fringing *Acacia xanthophloea* woodland and grassland	49	Lake Nakuru National Park
*664,000	Y	Open rolling grassland, riverine forest, *Acacia* woodland, swamps, non-deciduous thickets, *Acacia*, *Croton*, and *Tarchonanthus* scrub, rocky escarpments	50	Masai Mara
273,300	Y	Montane forest, bamboo thickets and grassland	51	Mau Forest Complex
*40,000	N	Montane grassland, farmland	52	Mau Narok/Molo Grasslands
10,500	Y	Mid-altitude tropical forest, transitional to montane forest	53	North Nandi Forest
1,000	N	Basalt cliffs, dry *Juniperus-Podocarpus* forest	54	Ol Donyo Sabache
18,000	Y	Mid-altitude tropical forest, transitional to montane forest	55	South Nandi Forest
*50,000	N	Open *Acacia tortilis* woodland, dense *Acacia-Commiphora* bush, *Tarchonanthus* thicket, grassland and sub-montane forest	56	South Nguruman
*250	N	Seasonally flooded grassland and riverine scrub, surrounded by intensive agriculture	57	Busia Grasslands
18,300	Y	Mid-altitude tropical rainforest, grassy and bushed glades	58	Kakamega Forest
*45,000	Y	Montane forest, bamboo, moorland and wooded grassland	59	Mt Elgon
*400	N	Papyrus swamp	60	Sio Port Swamp


Map 1
Kenya's Important Bird Areas
(IBAs)
N
0
100
200
Kilometres
Forest Reserve
National Reserve
Important Bird Area
(Forest Reserve/NP/NR)
National Park
Lake/Ocean
Important Bird Area
(No official protection)

Key to IBA sites indicated on the map on the opposite page

Site code	Site name	Site code	Site name
1	Aberdare Mountains	31	Meru National Park
2	Kianyaga Valleys	32	Mwea National Reserve
3	Kikuyu Escarpment Forest	33	Samburu/Buffalo Springs National Reserves
4	Kinangop Grasslands	34	Shaba National Reserve
5	Mt Kenya	35	Dandora Ponds
6	Mukurweini Valleys	36	Nairobi National Park
7	Arabuko-Sokoke Forest	37	Dunga Swamp
8	Dakatcha Woodland	38	Koguta Swamp
9	Diani Forest	39	Kusa Swamp
10	Dzombo Hill Forest	40	Ruma National Park
11	Gede Ruins National Monument	41	Yala Swamp
12	Kaya Gandini	42	Amboseli National Park
13	Kaya Waa	43	Cherangani Hills
14	Kisite Island	44	Lake Baringo
15	Kiunga Marine National Reserve	45	Lake Bogoria National Reserve
16	Mida Creek, Whale Island & Malindi/Watamu Coast	46	Lake Elmenteita
17	Marenji Forest	47	Lake Magadi
18	Mrima Hill Forest	48	Lake Naivasha
19	Sabaki River Mouth	49	Lake Nakuru National Park
20	Shimba Hills	50	Masai Mara
21	Taita Hills Forests	51	Mau Forest Complex
22	Tana River Delta	52	Mau Narok/Molo Grasslands
23	Tana River Forests	53	North Nandi Forest
24	Tsavo East National Park	54	Ol Donyo Sabache
25	Tsavo West National Park	55	South Nandi Forest
26	Chyulu Hills Forests	56	South Nguruman
27	Dida Galgalu Desert	57	Busia Grasslands
28	Lake Turkana	58	Kakamega Forest
29	Machakos Valleys	59	Mt Elgon
30	Masinga Reservoir	60	Sio Port Swamp

for water catchment and for other wildlife. Especially on Mt Kenya, they are being severely degraded by large-scale illegal logging, encroachment and clearance for agriculture and cannabis plantations.

- **Arabuko–Sokoke Forest** (IBA 7), the largest remnant of the fragmented coastal forests of East Africa. Arabuko-Sokoke shelters six threatened species of birds, among many other important animals and plants. It is under threat from potential de-gazettement for settlement (despite the poor forest soils), tree poaching and unsustainable use of forest products.
- The tiny and fragmented **forests of the Taita Hills** (IBA 21), the northernmost outlier of the biologically rich Eastern Arc mountains. The Taita Hills forests shelter three endemic taxa of birds and many other scarce and distinctive animals and plants. The forests are so small that strict protection is required to prevent them from vanishing completely.
- The small **riparian forests along the lower Tana River** (IBA 23). These contain many threatened birds, as well as endemic mammals and plants. They are under threat from unsustainable use and clearance for cultivation.
- **Kakamega Forest** (IBA 58), the easternmost remnant of the great Guinea–Congo forests, and biogeographically unique. Kakamega is home to two globally threatened and many regionally threatened bird species. Many others are found nowhere else in Kenya. Kakamega's distinctive fauna and flora make it an important eco-tourist destination. The forest is already small and highly fragmented, and is being destroyed by encroachment, poaching of trees, and grazing of livestock that prevents forest regeneration.
- **South Nandi Forest** (IBA 55), which is close to Kakamega and similar in many respects. South Nandi shelters probably the world's largest population of the threatened and little-known Turner's Eremomela *Eremomela turneri*. Large areas of the forest have already been encroached. The remainder is being subjected to intensive and destructive mechanised logging. This degrades the forest structure and removes the eremomela's favoured trees.
- **Forest remnants on the south Kenya coast. Diani** (IBA 9) and **Kaya Waa** (IBA 13) are acutely threatened by encroachment and land allocation. Other IBAs here include **Dzombo Hill** (10), **Kaya Gandini** (IBA 12), **Marenji Forest** (IBA 17) and **Mrima Hill** (IBA 18), as well as the larger **Shimba Hills** forests (IBA 20). All are under pressure from a combination of land allocations, logging and removal of other forest products. These forests are extremely important for threatened species, and contain many rare and valuable plants.

(4) Other sites classed 'Critical' for conservation action include:

- **Nairobi National Park** (IBA 36), where the ecosystem is threatened by land-use changes and allocations that may block a crucial wildlife dispersal route.
- **Moist grasslands** around Busia (IBA 57), which hold several unusual birds including the threatened Blue Swallow *Hirundo atrocaerulea*. They are on the brink of disappearing completely as agriculture remorselessly expands.
- **Lake Naivasha** (IBA 48), under threat from pollution, alien species and potentially unsustainable rates of water extraction.
- **Tana River Delta** (IBA 22), where conflicts over land use threaten the integrity of this rich and complex ecosystem.
- The **Masai Mara** (IBA 50), where land use is rapidly changing in the wildlife dispersal area that surrounds the National Reserve.
- **River valleys** around Kianyaga (IBA 2) and Mukurweini (IBA 6), the stronghold of a threatened Kenya endemic bird, Hinde's Babbler *Turdoides hindei*. The babbler survives so long as it has a few thickets to shelter and nest in. As less and less land is left fallow, the babblers' refuges are fast disappearing.

The IBA study shows where conservation efforts should be focused to conserve biodiversity in Kenya. Publication of this directory completes the initial phase of the IBA programme. The next phase aims to turn the recommendations outlined here into action. This work is co-ordinated by the BirdLife International Partner in Kenya – Nature Kenya (the East Africa Natural History Society) – and is supported by the Global Environment Facility through the United Nations Development Programme project 'African NGO-Government Partnerships for Sustainable Development' (section 3.1.7).

Nature Kenya has joined with over 20 government departments and non-government organisations to form an IBA National Liaison Committee (section 3.1.6) that is working to co-ordinate efforts for IBA conservation country-wide.

2 Acknowledgements

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The priorities for action reported here, and the methodology for priority setting, were developed during a workshop organised by Nature Kenya in December 1998. We thank the Global Environment Facility and United Nations Development Programme for supporting this meeting under the project 'African-NGO Government Partnerships for Sustainable Biodiversity Action'; Paul Matiku and Solomon Mwangi of Nature Kenya for organising the workshop; and the participants, Yilma Dellelegn, Paul Matiku, Patrick M'mayi, Ambrose Mugisha, Evans Mwangi, Solomon Mwangi, James Mwang'ombe, Kariuki Ndang'ang'a, Paul Njuguna, Annita Tapilala, Munir Virani and Mengistu Wondafrash, for their input. Our descriptions of the biological rationale behind IBAs and the categories and criteria used to define them are based on text supplied by Lincoln Fishpool (BirdLife International). We have also drawn on the inventory of IBAs in Ethiopia (EWNHS 1996) for inspiration in several places.

Finally, we would like once again to thank Paul Buckley of the RSPB for his support, encouragement and assistance at all stages of this project.

3 Introduction

3.1 Overview

3.1.1 Kenya's biodiversity

Kenya is rich in biological diversity. Around 25,000 species of animal and 7,000 plants have so far been recorded, along with at least 2,000 fungi and bacteria (NBU 1992). An enormous range of species inhabits the country's varied habitats, from its crowded and colourful coral reefs to icy alpine moorland. The biology of the vast majority of these organisms is little known. Undoubtedly many species have not even been named yet by science. Their value to Kenya's human population, as sources of useful genes, as food or medicine, or as vital parts of ecological systems, has barely been studied.

What is clear, however, is that Kenya's biodiversity is under serious threat. An expanding population is putting severe pressure on the environment. Impoverished people are forced to use resources unsustainably. Natural habitats continue to be cleared and converted. Land is degraded and water polluted; ecosystems are damaged and their functions impaired.

Without concerted and carefully focused action, we are likely to lose much of Kenya's diversity of life. The wider consequences of this can only be guessed at. The resources to support action are scarce, however. We need to know where our biodiversity is and what state it is in. Which sites and habitats are the most important, which are the most threatened, and which therefore require the most urgent attention?

Kenya already has an extensive protected area system. Over 10% of the country's land area is presently gazetted as National Parks, National Reserves or Forest Reserves. Should this not be sufficient to conserve our biodiversity? Unfortunately, it is not. Many protected areas (especially Forest Reserves) face serious conservation problems despite their status. Also, very few of Kenya's protected areas were chosen to conserve biodiversity as such. Our parks and reserves exist for a variety of reasons. Land was set aside because it contained good populations of 'big game' (i.e. large mammals) that might attract visitors, because it protected water catchments, because it supported valuable timber for exploitation, or simply because at the time very few people wanted to live there. There is no reason why sites selected in this way should contain exceptionally rich or distinctive fauna and flora. To select the most important sites for biodiversity conservation, we need to focus clearly on biodiversity to begin with.

Unfortunately, assessing biodiversity is difficult, expensive and extremely time-consuming (e.g. Lawton *et al.* 1998). By the time we obtained adequate information, it would be too late to make use of it. We need to find workable ways to short-cut the process by using the data we already have. One way to do this is to focus on birds.

3.1.2 Using birds to assess conservation priorities

This directory is a contribution to identifying Kenya's biodiversity conservation priorities. The Important Bird Areas process uses birds to select key sites for conservation. Important Bird Areas (IBAs) are sites of global biodiversity conservation importance that are chosen using internationally agreed, objective, quantitative and scientifically defensible criteria. IBAs are selected because they hold bird species that are threatened with extinction, have highly restricted distributions, or are characteristic of particular biomes. Sites holding exceptionally large numbers of congregatory birds also qualify.

Birds are an important focus for conservation attention in their own right (Diamond & Filion 1987, Fanshawe & Bennun 1991). They play major roles in the functioning of many ecosystems, particularly through pollination and seed dispersal. Birds are an important source of revenue through birdwatching tourism and sport hunting – both growing activities in Kenya. As elsewhere in the world, birds have great significance in many Kenyan cultures. Birds also provide an excellent means to create awareness of nature and the environment among young people.

As well as their intrinsic importance, birds as a group have many features that make the IBA process a useful short-cut to setting biodiversity conservation priorities:

- they are widespread – birds occur in every habitat in Kenya
- they are diverse, yet there are not so many species that identification becomes a major difficulty

- they are taxonomically well-known and stable
- they are relatively large and conspicuous, and mainly active by day, and therefore easily surveyed
- they have wide popular appeal, so many people have collected useful information on their distribution and status.

As a result, we have much more information about birds in Kenya than about any other group of organisms. The exception is perhaps large mammals, which have been the traditional focus of ecological research and conservation efforts in Kenya. Large mammals, however, make poor indicators of biological diversity, at least in eastern Africa. First, they are not very diverse. In Kenya there are approximately 126 species of large terrestrial mammals (Davies and Vanden Berghe 1994), excluding the insectivores, bats, rodents, hares and elephant shrews, which are mainly small, nocturnal and little-known. This compares to around 1,089 species of birds. Second, large mammals tend to have relatively extensive distribution ranges, so it is difficult to use them to identify areas of high endemism. Only a handful of Kenya's large mammals are narrow endemics, as opposed to at least 25 Kenyan birds that have very small global ranges (Stattersfield *et al.* 1998; see section 3.3.5 and Appendix 2). Third, large mammals are often in direct conflict with people. Thus particular species have been eliminated from many areas, although these places may still be very important for other, less conspicuous biodiversity (including birds).

By contrast, it has been shown that using birds can be a highly efficient way to identify a set of national conservation priorities (Howard *et al.* 1998). Although the distribution of threatened or endemic birds may not be entirely congruent with the distribution of, say, similarly important plants or butterflies, the set of sites that contains bird species of concern will effectively conserve other taxa as well.

This is the approach taken by the Important Bird Areas programme, and presented in this directory. Of course, birds are not perfect surrogates for biodiversity in general. Some sites with, for example, rare plants, endemic amphibians or unusual bacteria will no doubt not be included within the IBA network. Conversely, a few sites are important only for their rare birds, and not for other wildlife. The need to collect information on a range of little-known organisms remains pressing. However, taking steps to protect or sustainably manage Kenya's 60 IBAs should, at the least, greatly improve the conservation status of national biodiversity.

3.1.3 Aims of the directory

This directory identifies and describes a set of key sites for the conservation of Kenya's birds and biodiversity. Specifically, it has the following objectives:

- To contribute to the development and implementation of a national biodiversity strategy.
- To assist Kenya to meet its obligations under the Convention on Biological Diversity and other international agreements touching on biodiversity conservation.
- To inform decision-makers and technical advisers at local, national and international levels of the existence and vital importance of these sites, so that appropriate steps can be taken for their conservation.
- To identify clear priorities for conservation action, and encourage Government, national and international non-government organisations and international agencies to address these.
- To identify research needs and gaps in knowledge that should be addressed by the scientific community.
- To provide relevant and useful material for training and education.
- To provide information that can be used by birdwatchers, and can contribute to the growth of ecological tourism in Kenya.

3.1.4 The Important Bird Areas programme in Africa

The Important Bird Areas (IBA) programme is coordinated by BirdLife International, a global Partnership of conservation organisations. BirdLife presently has Partners in more than 60 countries across the world, and is represented in many others. The mission of BirdLife International is to conserve all bird species on earth, and their habitats. Through this, the organisation works for the world's biodiversity and the sustainable use of natural resources. This is a large task for which priorities need to be set at the levels of species, sites and habitats. The Important Bird Areas (IBA) programme is, in its first stage, a process of setting site-based priorities for birds based on existing information about species (for example, lists of birds that are globally threatened or have small global ranges (ICBP 1992, Collar & Stuart 1985, Collar *et al.* 1994)).

The IBA programme was first begun in Europe in 1985. The resulting publication (Grimmett & Jones, 1989) has been influential in promoting the development of conservation initiatives and collaboration among organisations across the continent. It has proved very valuable in presenting clear statements to decision-makers about conservation needs, and has frequently guided conservation efforts. In 1989 only about 25% of the 2,444 sites listed in 32 European countries had any formal protection; by 1995 the proportion had risen to 50%. In the meantime, an IBA programme was launched in the Middle East. This resulted in a directory documenting 389 sites across 14 nation states (Evans, 1994). Here, too, the inventory is already proving a valuable advocacy tool and at least five sites now benefit from formal protection which previously had none.

A similar programme began for Africa in 1993 (Bennun & Fishpool, in press). Field surveys started in 1994 in several countries. Work in Kenya began in January 1995. The first national IBA inventory was published by the Ethiopian Wildlife and Natural History Society in 1996. BirdLife Partners are carrying out full IBA programmes in nine African countries. Other individuals and organisations are compiling information on IBAs elsewhere. One result of the inventory process will be a continental directory of globally important sites, to be published in the year 2000. There is more to the IBA process than compiling information, however. The process creates awareness in-country of the need for bird conservation and develops institutional capacity for ornithological research, conservation advocacy and practical action. The programme is thus a means to an end: the effective conservation of IBAs (and hence biodiversity) at the national level.

3.1.5 The IBA programme in Kenya

The Important Bird Areas programme in Kenya is co-ordinated by Nature Kenya (the East Africa Natural History Society), the BirdLife Partner in Kenya, with support from the Royal Society for the Protection of Birds and latterly the Global Environment Facility. The bulk of the technical work has been carried out by the Ornithology Department of the National Museums of Kenya. Since the start of the programme, an Advisory Council with representation from various ministries and departments has provided a direct link to Government. In 1998, the Council evolved into an IBA National Liaison Committee with broader membership and terms of reference.

Field survey work by the Department of Ornithology began in January 1995, based on a preliminary analysis of gaps in knowledge. Sites and areas that were surveyed (see Nasirwa & Bennun 1995, Nasirwa *et al.* 1995a,b, Nasirwa & Njoroge 1996, 1997, Waiyaki 1996, Waiyaki & Bennun 1996) include:

- creeks, estuaries and beaches along much of the Kenya coast
- papyrus swamps and other wetland sites along the entire Kenyan shoreline of Lake Victoria
- the series of five large dams on the upper Tana river
- South Nandi forest, and forests on Mt Kenya and in the Cherangani Hills, the Taita Hills and South Baringo district
- moist grasslands in Busia and Suba Districts.

Other published and unpublished information on potential sites was compiled in parallel, and information entered into a custom-designed database supplied by BirdLife International. The directory makes use of data collected up to the end of 1997, which is when the contents of the site accounts was finalised. Additional, more recent, information on many sites is available from the Department of Ornithology, National Museums of Kenya.

3.1.6 Future directions

Publication of this IBA inventory marks the end of one stage of the IBA process in Kenya. Subsequent stages should involve a cycle of monitoring, advocacy and action to ensure conservation of these sites in perpetuity. National and local capacity for achieving biodiversity conservation is to be built through this process.

The significance of the IBA programme for conservation of globally important biodiversity in Africa has been recognised by the Global Environment Facility (GEF). Through the United Nations Development Programme, the GEF is funding a five-year project, 'African NGO-Government Partnerships for Sustainable Biodiversity Action'. The project began in January 1998 and is being implemented by the African Partnership of BirdLife International. The project countries are Burkina Faso, Cameroon, Ethiopia, Ghana, Kenya, Sierra Leone, South Africa, Tanzania, Tunisia and Uganda.

The project builds directly on the existing IBA process. GEF funding allows the process to be scaled up and developed to the phase of monitoring, action

and advocacy. By building on existing NGO-Government links, the project supports national conservation planning and priority setting. Through its focus on birds and its NGO co-ordination, the project harnesses the abilities and energies of volunteers and community groups who can support site-based conservation and monitoring.

Project activities (some of which have already been started or completed) include:

- formalisation of the IBA National Liaison Committee
- setting priorities for conservation action at sites
- implementing advocacy, monitoring and action at key sites. This involves a variety of measures, including:
  - formulating a site-based process for monitoring and conservation
  - identifying stake-holders and existing structures
  - raising awareness locally and nationally
  - developing and strengthening local site-support groups
  - supplying site information to national-level co-ordination and priority-setting processes
  - stimulating conservation action, and locating resources to support it
  - preparing site action and management plans, and securing their implementation
- building local and national NGO and Government capacity to sustain the IBA process
- developing a regional structure to exchange information and expertise.

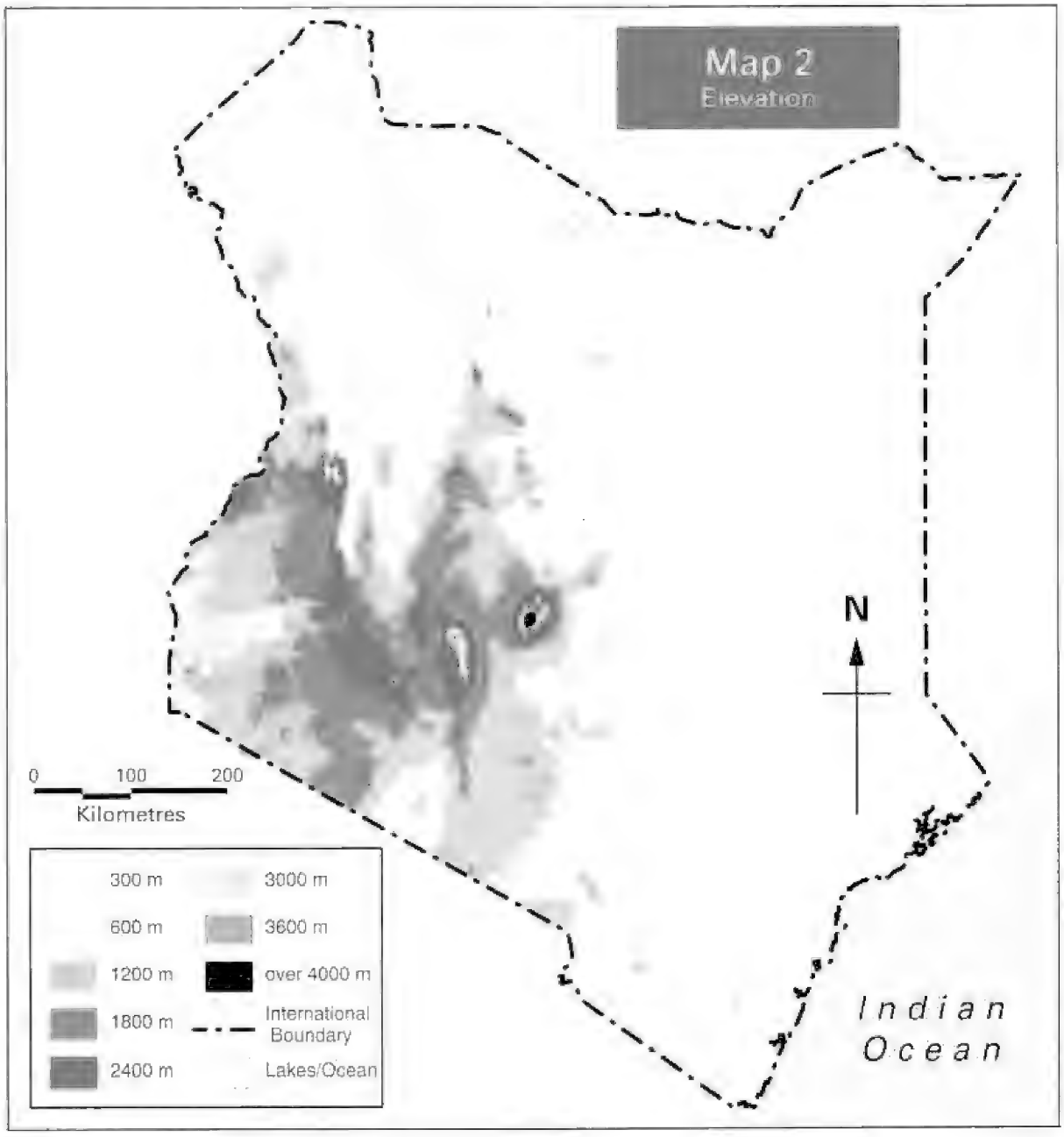
In other words, this programme (only briefly summarised here) provides the means to turn the information in this directory into tangible conservation action. Central to this is the IBA National Liaison Committee, which brings together key Government institutions and non-Government organisations concerned with conservation. At present, representation includes the African Conservation Centre, African Wildlife Foundation, Department of Resource Surveys and Remote Sensing, East African Wildlife Society, Forest Department, Kenya Forests Working Group, Kenya Tourism Board, Kenya Wildlife Service, Ministry of Education, Ministry of Lands, National Environment Action Plan, National Environment Secretariat, National Museums of Kenya, Nature Kenya, Permanent Presidential Commission on Soil Conservation and Afforestation, United Nations Development Programme, Wildlife Clubs of Kenya, World Conservation Union and the World Wide Fund for Nature.

3.2 Kenya: General information

3.2.1 Location and topography

Kenya lies astride the equator on the eastern coast of Africa. It is a medium-sized country by continental standards, covering an area of about 586,600 km^2. Inland water bodies cover some 10,700 km^2, the bulk of this in Lakes Victoria and Turkana. Kenya is bordered by Somalia and the Indian Ocean to the east, Ethiopia to the north, Sudan to the north-west, Uganda to the west and Tanzania to the south. The coastline, about 550 km long, faces the Indian Ocean.

Kenya has tremendous topographical diversity, including glaciated mountains with snow-capped peaks, the Rift Valley with its scarps and volcanoes, ancient granitic hills, flat desert landscapes and coral reefs and islets. However, the basic configuration is simple (Map 2). Coastal plains give way to an inland plateau that rises gradually to the central highlands, which are the result of relatively recent volcanic activity associated with the formation of the rift valley. To the west the land drops again to the Nyanza




Map 3
Annual rainfall
0
100
200
Kilometres
N
< 200 mm
200–400 mm
400–600 mm
600–800 mm
800–1200 mm
1200–1600 mm
1600–2000 mm
2000–2400 mm
>2400 mm

plateau that surrounds the Kenyan sector of Lake Victoria; and to the north, to the rugged low country around Lake Turkana.

The coastline is broken and composed of beaches, coral cliffs and reefs, creeks and numerous offshore coral islands. Inland, a mainly level but narrow coastal plain lies on sedimentary rocks, with some igneous intrusions such as Dzombo (IBA 10) and Mrima (IBA 18). Beyond low rolling hills lies the so-called Nyika plateau, mainly on sedimentary rocks. This is largely a thorn-bush plain with seasonal drainage lines and a few isolated rocky hills. This landscape covers almost the entire north-eastern sector of the country, on very gradual slopes.

The Great Rift Valley, with its associated escarpments and mountains, is a major feature. It runs the length of the country from Lake Turkana in the north to Lake Natron on the southern border with Tanzania. The central portion of the rift is raised, with the Aberdare Mountains (IBA 1) and Mt Kenya (IBA 5) to the east and the Mau Escarpment (IBAs 51 & 52) and Cherangani Hills (IBA 43) to the west. The northern and southernmost sectors of the rift are low-lying, arid and rugged, with spectacular volcanic landforms.

The region west of the central highlands is characterised by Precambrian metamorphic rocks and linear basement hills. Mt Elgon (IBA 59), an old, eroded volcano, intrudes through the ancient shield on the Uganda border. The Lake Victoria basin generally has a gently sloping landscape and an eroded surface that exposes granitic outcrops.

Isolated hills and mountains, such as Mt Kulal, Mt Nyiro and Mt Marsabit, are scattered to the north and east of the central highlands. The Taita Hills (IBA 21), rising from the south-eastern plateau, are an ancient fault-block formation, the northernmost of a chain of isolated peaks (the 'eastern arc') that stretches south to Malawi through eastern and southern Tanzania. They sit almost cheek-by-jowl with one of the region's most recent volcanic ranges, the Chyulu Hills (IBA 26).

3.2.2 Climate

Kenya is generally a dry country; over 75% of its area is classed as arid or semi-arid (see Map 3 and below) with only around 20% being viable for agriculture. Inland, rainfall and temperatures are closely related to altitude changes, with variations induced by local topography. Generally the climate is warm and humid at the coast, cool and humid in the central highlands, and hot and dry in the north and east.

Across most of the country, rainfall is strongly seasonal, although its pattern, timing and extent vary greatly from place to place and from year to year. The relatively wet coastal belt along the Indian Ocean receives 1,000 mm or more of rain per year. Most rain falls from April to July as a result of the south-easterly monsoon. Another moist belt occurs in the Lake Victoria basin and its surrounding scarps and uplands, mainly due to moist westerly winds originating over the Atlantic Ocean and Congo basin. Except immediately adjacent to the lake, rainfall occurs reliably from March to November. The upland plateaux adjacent to this area are less influenced by the lake, and rain falls mainly in March–May and July–September. In much of the central highlands, there is also a bimodal rainfall pattern, with rainy seasons in March–May and October–December, neither of them reliable. The highlands are surrounded by a set of semi-arid upland plateaux. To the north, the Laikipia plateau receives 400–800 mm of rain in indeterminate seasons. To the south, rainfall varies from 400–600 mm on the dry Rift floor to as much as 1,000 mm in the Loita Hills, with varying seasonality. The eastern plateau has a strongly bimodal regime, with erratic rainfall averaging 500–900 mm equally in March–May and November–December. The remaining 70% or so of the land area falls into the 'arid lowlands' zone (NRI 1996), with rainfall averaging less than 500 mm and varying greatly from year to year. Rainfall peaks in most areas are in November and April. Some 30% of this zone can be classed as semi-desert, with rainfall averaging less than 300 mm per year and evaporation often greater than 3,000 mm.

Except for the coast and Lake Victoria region, altitude is the main determinant of precipitation. The high-altitude areas (over c. 1,500 m) in the central Kenya highlands usually have substantial rainfall, reaching over 2,000 mm per year in parts of the Mau Escarpment. However, topography also has a major influence, with strong rain-shadow effects east of Mt Kenya and the Aberdare mountains. Here, even areas higher than 1,800 m may be relatively dry. In the arid lowlands the peaks of isolated mountains attract cloud and mist, and may support very different vegetation to that of the surrounding plains.

Differences in temperature vary predictably with altitude. Frost occurs regularly at 3,000 m and

occasionally down to at least 2,400 m, and there is permanent snow and ice on top of Mt Kenya (IBA 5) at 5,200 m. The hottest areas are in the arid north-east, and west of Lake Turkana (IBA 28), where mean maximum temperatures average over 34°C.

3.2.3 Water resources

All Kenya's major rivers drain from the central highlands, divided by the rift into those flowing westwards into Lake Victoria and those flowing eastwards towards the Indian Ocean. There are five major drainage basins: Lake Victoria, the Rift Valley, the Athi-Galana-Sabaki River (and coastal areas to its south), the Tana River and the northern Ewaso Ng'iro (see Map 4). Kenya only has a small part of Lake Victoria's water surface, but the Kenyan catchment contributes a disproportionate 33% of its surface inflow, some 470 million cubic metres a year (Hughes & Hughes 1992). The Rift Valley contains several basins of internal drainage, forming a chain of endorheic lakes from Lake Natron on the Tanzanian border, through Lakes Magadi, Naivasha, Elmenteita, Nakuru, Bogoria, Baringo and Turkana (IBAs 47, 48, 46, 49, 45, 44 and 28 respectively). These lakes vary in alkalinity, from freshwater Lake Naivasha (IBA 48) to the intensely alkaline Lake Magadi (IBA 47). Lake Turkana (IBA 28) is notable as a major volume of (more or less) fresh water in an otherwise arid and barren part of the country, while a number of rivers, including the Turkwel, Kerio, Athi-Galana, Tana and Northern and Southern Ewaso Ng'iro, flow for long distances through dry parts of the country. Here they may often be the only permanent source of water.

3.2.4 Vegetation

Kenya's natural vegetation is as diverse as its climate and topography would suggest. Dean & Irump (1983) mapped 19 distinct biotic communities, some of which can be lumped under general headings.

Afro-alpine moorland (1.2% of total land area) occurs above c. 3,000 m, on Mt Kenya (IBA 5), the Aberdare Mountains (IBA 1), the Cheranganis (IBA 43) and Mt Elgon (IBA 39). The vegetation is sparse at the upper levels (above c. 3,800 m), with species of giant *Lobelia* and *Senecio*; below this is grassland and *Erica* shrubland, often with stands of *Hagenia abyssinica* in sheltered spots.

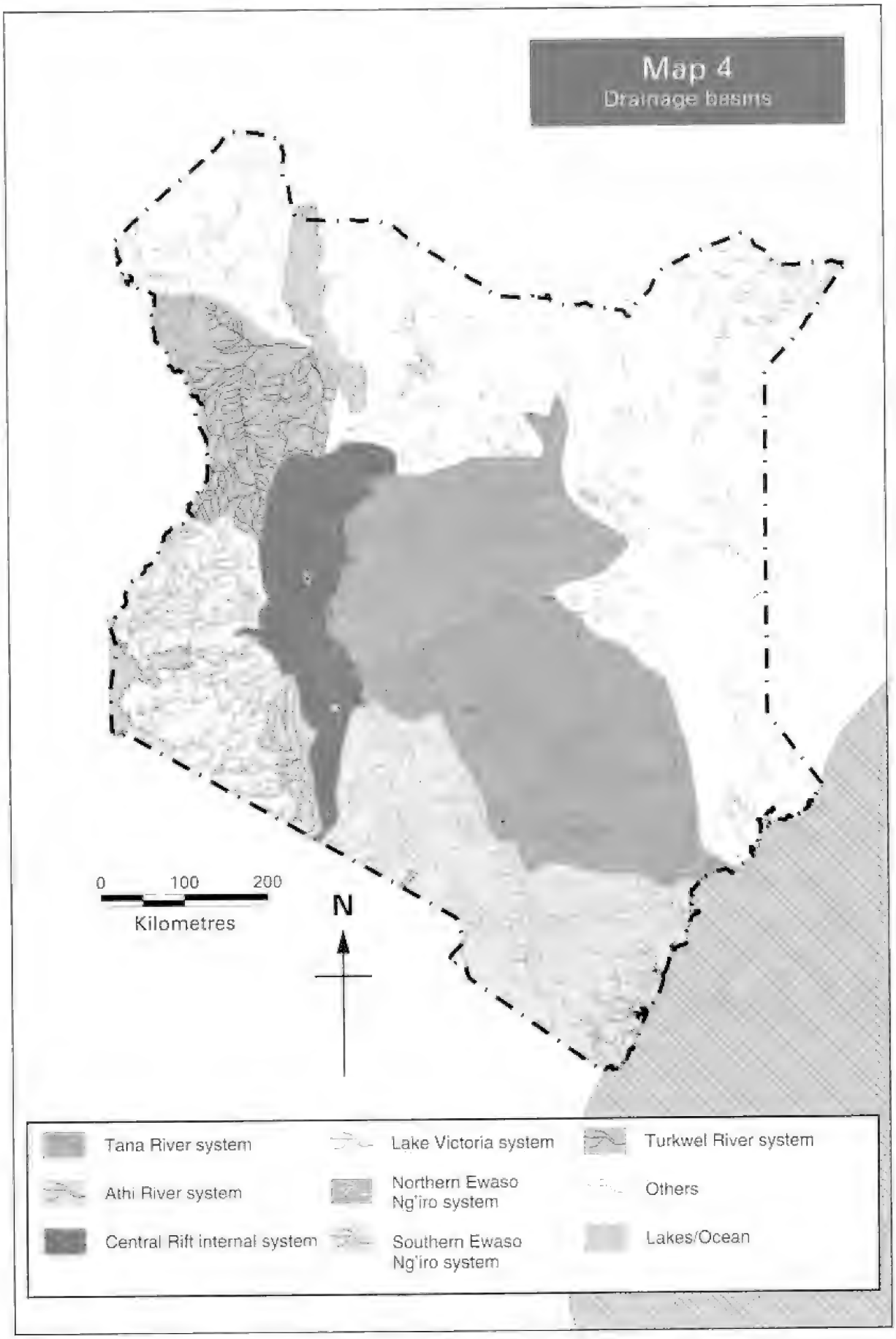
Highland grassland (0.05%) occurs above c. 2,400 m on either side of the central Rift Valley (in the Kinangop and Mau Narok/Molo Grasslands, IBAs 4 and 52). This restricted habitat is not covered in any protected area and is one of the most endangered in Kenya. Many tussock-forming grass species occur. Other important grassland types include **fire-induced grassland** (3.1%, e.g. parts of the Masai Mara, IBA 50) and **seasonal floodplain and delta grassland** (4.7%, e.g. the Tana River Delta, IBA 22). Grassland also occurs on alkaline volcanic ash (0.2%), e.g. to the south of the Chyulu Hills (IBA 26).

Highland moist forests (2.0%) occur between c. 1,500 m and 3,000 m in areas that receive rainfall of more than 1,200 mm per year. A mosaic of forest and bamboo *Arundinaria alpina* is often present at the higher levels. Typical montane forest trees include species of *Podocarpus*, *Olea*, *Juniperus* and *Newtonia*, but the forest type varies greatly according to altitude and rainfall.

Relicts of **Guineo-Congolian rainforest** (0.1%) occur in western Kenya, in and around Kakamega Forest (IBA 38). Despite its relatively high altitude (1,600 m), in terms of biogeography Kakamega is the easternmost outlier of the great tract of tropical rain forest that once extended across equatorial Africa. The average annual rainfall is over 1,900 mm, and typical tree species include *Celtis*, *Antiaris*, *Croton*, *Fagara* and *Manilkara*. The North and South Nandi Forests (IBAs 53 and 55) are transitional between the Guineo-Congolian and montane forest types.

Several types of **coastal forests** and woodland (0.1%), characteristic of the Zanzibar-Inhambane Mosaic vegetation region, occur along the narrow coastal strip. These patches are mainly small and relictual, and the forest structure and composition vary greatly according to soil type and rainfall. Characteristic trees include *Cynometra*, *Manilkara*, *Afzelia*, *Brachylaena* and *Brachystegia*. **Coastal evergreen bushland** (0.4%) also occurs, in a mosaic with cultivated land; this is almost always a secondary vegetation type. **Coastal palmstands**, often in tall grassland, are a rare vegetation type covering less than 0.1% of the land area. They are concentrated near the Ramisi River in the south, and around the Tana River Delta (IBA 22) in the north.

Elsewhere, **highland dry forests** (0.4%) occur on hill-tops that attract mist and rain (e.g. Mt Marsabit and the Taita and Chyulu Hills, IBAs 21 and 26). **Riverine forests** (e.g. along the Mara River) and **groundwater forests** (e.g. Kitovu) together make up c. 1.5% of the land area.


Map 4
Drainage basins
0
100
200
Kilometres
N
Tana River system
Athi River system
Central Rift internal system
Lake Victoria system
Northern Ewaso Ng'iro system
Southern Ewaso Ng'iro system
Turkwel River system
Others
Lakes/Ocean

Thorn bushland and **woodland** are the most extensive vegetation types in Kenya (41.7%), running from Amboseli (IBA 42) in the south through the Tsavo parks (IBAs 24 and 25) to north-east and north-west Kenya. Characteristic tree species are *Acacia*, *Commiphora* and *Combretum* spp., while grasses include species of *Hyparrhenia*, *Digitaria* and *Themeda*. This habitat often contains concentrations of large mammals and many large protected areas are in this vegetation zone. It is often favourable for ranching and pastoral land. This vegetation grades into **semi-arid wooded and bushed grassland** (0.2%).

The north-central and north-western parts of the country are covered by **semi-desert** (16.8%) with characteristic shrubby thornbush species, mainly *Acacia*. In places, such as the Dida Galgalu (IBA 27) and Chalbi Deserts and around Lake Turkana (IBA 28), areas of **barren land** (0.4%) occur, with very little vegetation. **Marine beaches and dunes** make up another 0.04% of the land area.

Wetlands are an important habitat in Kenya, covering about 14,000 km^2 of the country's land surface (Crafter *et al.* 1992). Strongly **alkaline lakes** (0.04%), mainly in the Rift Valley, lack macrophytes, except at river inflows, but may have large blooms of microscopic plants – notably the cyanophytes *Spirulina* spp. **Papyrus swamps**, consisting largely of stands of *Cyperus papyrus*, are found patchily around the shores of Lake Victoria, mainly along river inflows. Elsewhere this habitat is widely scattered, with notable patches at Lake Naivasha (IBA 48) and Lake Jipe. (Only Lake Victoria's papyrus holds the suite of bird species specialised on this habitat, in IBAs 37, 38, 39, 41 and 60.) Swamps of other *Cyperus* species, *Typha* or *Phragmites* occur locally but are rarely of any great size. **Permanent swamps** make up 0.11% of the land area, while bodies of **freshwater** cover 2.1% of Kenya's surface area.

Mangrove swamps (0.2%) occur along parts of the Kenyan shoreline, especially in sheltered creeks and estuaries. Eight species of mangroves occur, the commonest of which is *Rhizophora mucronata*. Lamu District has the country's most extensive mangrove swamps. On sandy shorelines are often beds of seagrass (some twelve species are recorded), beyond the littoral zone or in deeper channels within it. **Coral reefs and islands** make up some 59,000 ha, or 0.1% of the land area.

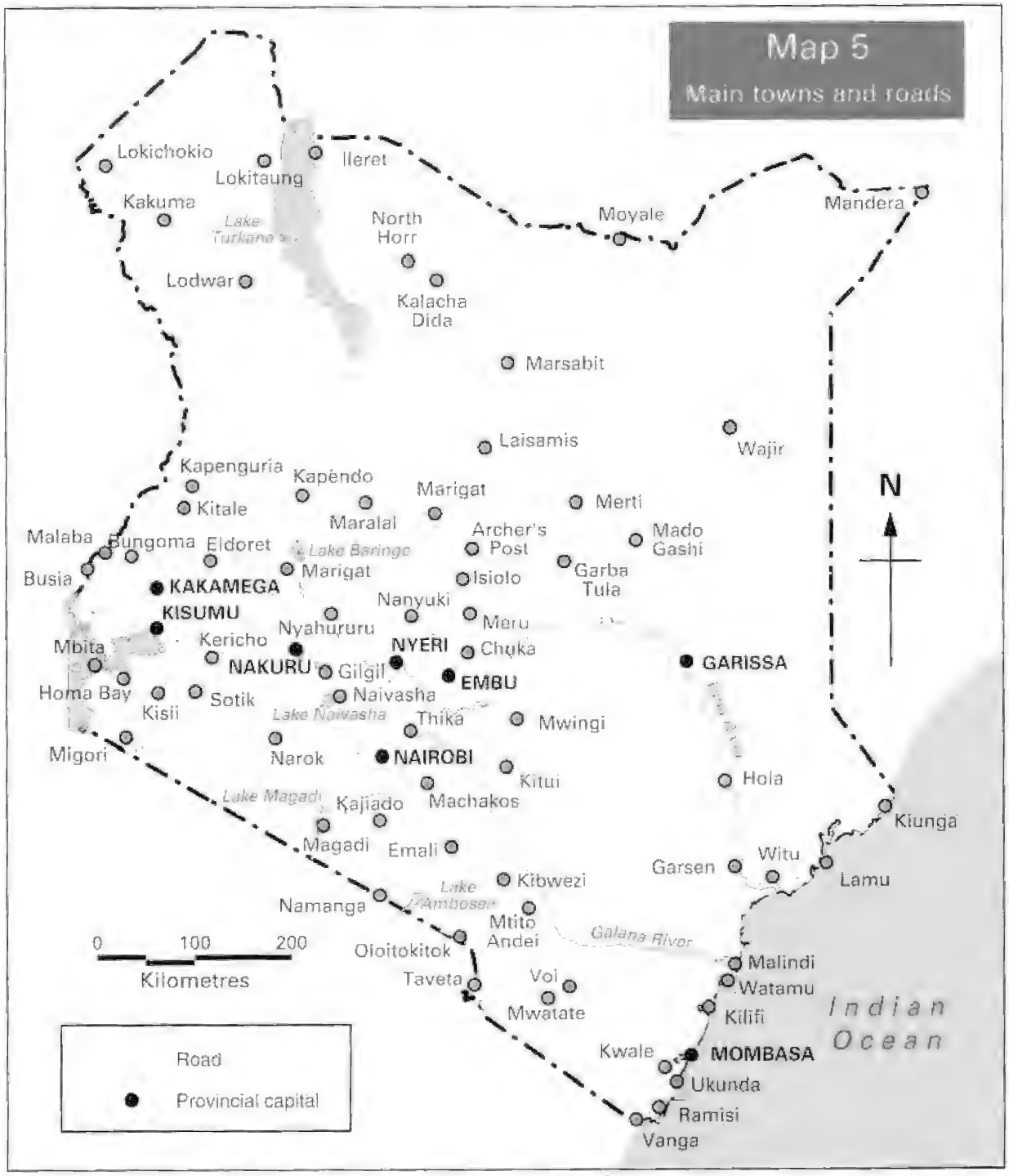
Human-modified habitats, created at the expense of the natural vegetation, occur throughout the country but especially in the highlands. These include cultivated land under a wide variety of crops (18%), plantations of exotic trees, secondary thicket and scrub, eroded and de-vegetated woodland and bushland, and overgrazed pastureland.

3.2.5 Population and economics

As a nation, Kenya is ethnically and culturally diverse. This diversity was created by a series of migrations of various peoples from other parts of the continent, mainly Cushites, Nilotes and Bantu. During the 20th century this has been augmented by the arrival of Asians and Europeans.

Map 5 shows the major towns and road networks in Kenya. The country's population has increased rapidly from 8.2 million in the early 1960s to 15.2 million people by 1979 and 22 million in 1987. Today the population is estimated at close to 30 million people, most of them concentrated in the high rainfall areas. The average annual population growth rate has fallen from a high of 4% (one of the highest rates in the world) to around 2.7%, and varies within the country. Rates of increase are especially high in the central Kenya highlands, western Kenya and urban areas. Human population densities are also high, with an average of c. 50 persons/km^2, but this again varies with region. In the north and north-east of the country just 20% of the total population occupies 80% of the land area. Only 18% of the land in Kenya is arable, with another 9% marginal; the rest is rangeland and semi-desert (NRI 1996). This limited arable area supports all the major cash crops, 80% of the population and most of the indigenous forest estate (Juma 1989). The rapid growth in the country's population has subjected this productive land to tremendous pressure. The population increase is now spilling over to marginal areas, accelerating land degradation. The increasing demand for agricultural land and woodfuel has led to high rates of deforestation (an estimated 1% loss of forest area per year). Savannah and montane grasslands, occupying some 80,000 km^2, are being converted to wheat fields and pasture, while many wetlands (especially swamps and marshes) are in danger from drainage for agriculture. The momentum of population growth is decreasing, but it will take a long time before its impacts diminish.

Kenya is a low income economy. GNP per capita in 1997 was US$ 330 per capita, and has been more or less static since 1992 (World Bank 1998). Income is very inequitably distributed, with the highest 20% of



earners receiving more than 60% of the income (and 48% of income going to the top 10%), compared to just 3.4% for the lowest quintile (World Bank 1998). The economy is mainly agriculture-based with over 80% of the total labour force in this sector. Agriculture presently earns over 60% of Kenya's foreign exchange; the traditional export crops of tea and coffee have been joined by cut flowers and various horticultural crops in recent years. Tourism is the other key sector for foreign exchange earnings, with over 800,000 tourists visiting the country in some recent years. Major tourist attractions are the coast, with its beaches and coral reefs, and the variety of national parks and reserves with their populations of large mammals. Bird tourism appears to have been increasing its share of the total steadily in recent years, although no detailed data are available, and there is substantial unrealised potential in this area.

3.3 Important Bird Areas in Kenya

3.3.1 Aim of the IBA programme

The function of the Important Bird Areas (IBA) programme is to identify and protect a network of sites, at a biogeographic scale, critical for the long-term viability of naturally occurring bird populations, across the range of those bird species for which a sites-based approach is appropriate.

3.3.2 What are IBAs?

Important Bird Areas are places of international significance for the conservation of birds at the global, regional or sub-regional level (Bennun & Fishpool, in press). (In this directory, only the **global** level is considered.) They are identified using standardised, internationally agreed criteria (applied with common sense!). IBAs are a practical tool for conservation. Sites must, wherever possible, be amenable to being conserved and to being delimited from surrounding areas, and be large enough to support viable populations of the species for which they are important. When selecting IBAs the existing Protected Areas Network is, for practical purposes, considered first but additional sites are often brought onto the conservation agenda for the first time.

IBAs are one of an armoury of approaches to bird conservation. They are not the whole or the only answer. Some bird species are not well protected by the IBA approach (such as large raptor species dispersed at low densities across wide areas), and for others IBAs may only be appropriate across some of their range or for parts of their life cycle (for example, colonially nesting species which disperse extensively during the non-breeding season). IBAs should form part of a wider, integrated approach to conservation that includes sites, species and habitat protection (Tucker & Heath 1994). Nonetheless, they do have many strengths. They are objectively defined using established criteria, which helps give the results of the process weight and credibility. This also means that IBAs effectively form a global conservation currency. The criteria are simple and robust enough that they can be applied uniformly and cost-effectively. Information about IBAs is generated by local organisations, working on the ground. This means that the site identification process can be a powerful way to build institutional capacity and set an effective conservation agenda: it is far more than a technical research exercise. For these reasons, IBAs can be a practical and effective lever for conservation.

3.3.3 Biological rationale

Some sites are exceptionally important for maintaining the animals and plants that depend upon the habitats and ecosystems in which they occur. Vigorous protection of the most critical sites is one important approach to conservation. Many bird species may be effectively conserved by this means. Patterns of bird distribution are such that it is often possible to select sites that support many species. These sites, carefully identified on the basis of the bird numbers and species complements that they hold, are termed Important Bird Areas (IBAs). IBAs are selected such so that when taken together they form a network throughout the species' biogeographic distributions. This network may be considered as a minimum essential to ensure the survival of these species across their ranges should remaining habitat elsewhere be lost. These sites may include the best examples of the species' natural habitat, in terms of distinctively high numbers or densities (particularly in habitats already much degraded), or 'typical examples' (particularly in habitats as yet little modified). Because all are, or may increasingly become, refuges, if any one of them is lost the consequences may be disproportionately large.

Moreover, birds have been shown to be effective indicators of biodiversity in other plant and animal groups – especially when used to define a set of sites for conservation (Howard *et al.* 1998). Thus, although the IBA network is defined by its bird fauna, its conservation would ensure the survival of a correspondingly large number of other taxa.

While sites are selected using scientifically defensible, quantitative criteria, the IBA concept is pragmatic. Thus, the existing protected area network is taken fully into consideration. In many cases it will form the backbone of the network with additional sites proposed to fill in the gaps. Ideally, each site should be large enough to support self-sustaining populations of as many of the species as possible for which it was identified or, in the case of migrants, provide their requirements for the duration of their presence.

Table 2
Important Bird Areas:
Summary of global categories
and criteria

Category	Criterion	Notes
A1 Globally-threatened species	The site regularly holds significant numbers of a globally threatened species, or other species of global conservation concern.	The site qualifies if it is known, estimated or thought to hold a population of a species categorised as Critical or Endangered. Population-size thresholds for Vulnerable, Conservation Dependent, Data Deficient and Near Threatened species are set regionally, as appropriate, to help in site selection.
A2 Restricted-range species	The site is known or thought to hold a significant component of the restricted-range species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).	The site also has to form one of a set selected to ensure that, as far as possible, all restricted-range species of an EBA or SA are present in significant numbers in at least one site and, preferably, more.
A3 Biome-restricted species	The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.	The site also has to form one of a set selected to ensure that, as far as possible, all species restricted to a biome are adequately represented.

Category	Criterion	Notes
A4 Congregations	**(i)** The site is known or thought to hold, on a regular basis, ≥1% of a biogeographic population of a congregatory waterbird species.	This applies to waterfowl species as defined by Rose & Scott (1994). Thresholds are generated in some instances by combining flyway populations within a biogeographic region, but for others lacking quantitative data, thresholds are set regionally or inter-regionally, as appropriate. In such cases, thresholds will be taken as estimates of 1% of the biogeographic population.
	(ii) The site is known or thought to hold, on a regular basis, ≥1% of the global population of a congregatory seabird or terrestrial species.	This includes those seabird species not covered by Rose & Scott (1994). Where quantitative data are lacking, numerical thresholds for each species are set regionally or inter-regionally, as appropriate. In such cases, thresholds will be taken as estimates of 1% of global population.
	(iii) The site is known or thought to hold, on a regular basis, ≥20,000 waterbirds or ≥10,000 pairs of seabirds of one or more species.	This is the Ramsar criterion for waterbirds, the use of which is discouraged wherever data are good enough to permit the use of (i) or (ii).
	(iv) The site is known or thought to exceed thresholds set for migratory species at bottleneck sites.	Thresholds are set regionally or inter-regionally, as appropriate.

Some bird species are, however, not amenable to conservation through a sites-based approach and require different treatment. These include species that are widely dispersed at low densities, or nomadic birds that range over large distances. For others, the sites-based approach needs to be combined with conservation measures in the wider environment.

3.3.4 Categories and criteria

The category and criteria definitions given in these notes and the accompanying table are the standard guidelines for the identification of IBAs. Since definitions of this sort cannot cover all possibilities, they are not inflexible rules. These guidelines have been followed closely in selecting IBAs in Kenya, with the recognition that the need for scientific objectivity and standardisation has to be balanced by common sense and practical objectives.

For some of the categories quantitative thresholds are used in site selection. Others (A2 and A3) are more qualitative and require only that particular groups of species be present. Full data are not always necessary to list a site as an IBA. Inferences about numbers or species present may be made on the basis of, for example, the type and extent of appropriate habitat. In the Kenyan case, however, selection of almost every IBA is based on confirmed data or records (though some components of sites, for example some individual forests in the Tana River Forests (IBA 23) or patches of grassland in the Busia Grasslands (IBA 57), are listed because they appear to have suitable habitat for the species of concern). For a number of sites there are no adequate data even for inference of populations or species presence. This is the case for some of the sites listed as potential IBAs in section 4.3.

Each category is supported by an appropriate species list and, where necessary, population thresholds (Fishpool 1996). The species that are relevant for Kenya are listed in Appendices 1–4. The categories and criteria are summarised in Table 2.

Category A1 Globally-threatened species

Criterion: **The site regularly holds significant numbers of a globally-threatened species, or other species of global conservation concern.**

Notes

- This category refers to species classified as globally threatened with extinction, Conservation Dependent or Data Deficient according to the new IUCN criteria for threatened status. The last two categories of species, although not strictly globally threatened, are considered to be of sufficient global conservation concern to merit the identification of Globally Important Bird Areas. All such species are listed in *Birds to Watch 2* (Collar *et al.* 1994). Population size thresholds for site selection and notes on how to apply this category are agreed regionally, as appropriate, on a species by species basis, to take into account relevant features of the ecology of each and the reason(s) for its decline. In general, the regular presence of a Critical or Endangered species, irrespective of population size, at a site may be sufficient to propose the site as an IBA. For Vulnerable species, the site may need to hold more than a defined threshold to qualify; 1% of the global population may be appropriate for some. For Africa, a population threshold of 10 pairs or 30 individuals has been agreed for Vulnerable species.
- The words 'regular' and 'significant' in the criterion definition are intended to exclude instances of vagrancy, marginal occurrence, ancient historical records etc. 'Regularly' includes seasonal presence (and at longer intervals, if suitable conditions themselves only occur at extended intervals, e.g. temporary wetlands). However, sites that have the potential to hold threatened species, following habitat restoration work or re-introductions etc., are not excluded.
- Provision is also made for the inclusion in this category of species of Near-Threatened (NT) status, as defined and listed in Collar *et al.* (1994). However, Collar *et al.* make it clear that NT designation is rather arbitrary and inconsistently applied compared to the list of threatened species. In consequence, this category will only be applied for NT species on a case by case basis, agreed within the relevant region or regions. Moreover, given that the majority of NT species also qualify under categories A2–A4 they will be preferentially included in them. Identification of sites for NT species alone under category A1 will therefore be rare: none has been identified in this directory. For Africa the following population thresholds have been agreed for near-threatened species: non-passerine birds,

10 pairs or 30 individuals; passerines, 30 pairs or 90 individuals.

- This is even more true of globally threatened sub-species, for which no established list exists. Very exceptionally, known globally threatened subspecies may be included under this category, again on an argued, case by case basis within the relevant region. This is most likely to be applied to well-marked, isolated forms, possibly valid species, that occur e.g. on oceanic islands. Wherever possible such taxa will be included within IBAs identified for other species or under other criteria. No IBA has been identified in Kenya solely for globally threatened sub-species.

Category A2 Restricted-range species

Criterion: **The site is known or thought to hold a significant component of a group of species whose breeding distributions define an Endemic Bird Area (EBA) or Secondary Area (SA).**

Notes

- This category is for species of Endemic Bird Areas (EBAs) (Stattersfield *et al.* 1998). EBAs are defined as places where two or more species of restricted range, i.e. with world distributions of less than 50,000 km^2, occur together. More than 70% of such species are also globally threatened. Also included here are species of Secondary Areas. A Secondary Area (SA) supports one or more restricted-range species, but does not quality as an EBA because less than two species are entirely confined to it. Typical SAs include single restricted-range species which do not overlap in distribution with any other such species, and places where there are widely disjunct records of one or more restricted-range species, which are clearly geographically separate from any of the EBAs.
- For many EBAs, which hold a large number of restricted-range species, it is necessary that a network of sites be chosen, by complementarity analysis, to protect adequately all relevant species. In cases where data on bird distribution within the EBA are insufficient, the network will ensure that sufficient (for example, at least 10%) of the key habitat types are included.
- The 'significant component' term in the criterion is intended to avoid selecting sites solely on the presence of one or more restricted range species that are common and adaptable within the EBA and, therefore, occur at other chosen sites. Additional sites may, however, be chosen for one or a few species that would otherwise be under-represented.

Category A3 Biome-restricted assemblages

Criterion: **The site is known or thought to hold a significant component of the group of species whose distributions are largely or wholly confined to one biome.**

Notes

- This category applies to groups of species with largely shared distributions of greater than 50,000 km^2, which occur mostly or wholly within all or part of a particular biome and are, therefore, of global importance. Many of these assemblages occur in places – deserts etc. – where delimiting IBAs is particularly difficult.
- A biome may be defined as a major regional ecological community characterised by distinctive life forms and principal plant species. No system of global biome classification has been found which can be adequately used as a basis for generating bird species lists. This has necessitated a regional approach and resulted in inter-regional differences between the classification systems employed but, as far as possible, the overall scale – the 'depth' of treatment ' at which biome divisions are recognised – is comparable.
- More than one habitat type, and therefore bird community, often occurs within a given biome and this will need to be reflected by the set of sites identified. In many cases the application of the category will be habitat driven; thus, the quality and representativeness of the habitat types within sites may determine their selection. This is because it may be impractical or impossible to provide either definitive lists of all species that characterise a given biome (at least for the present) or produce exhaustive and lengthy species inventories for each site.
- The number of sites selected per country under this category should take into account both the size of the country and the relative amount of a given biome within it. The size of the site is also relevant here; it is preferable to select a few, large sites that reflect the distribution of biomes across the country rather than many small ones confined to only a part of it. This will ensure

that a greater number of species are represented per site and take account of their geographical distribution. Sites should not, however, be so large that they are not amenable to conservation and, in some cases, small sites with high population densities may be preferable to large ones with lower densities.

- Common sense has to be used to ensure that a large number of sites each holding only a few of the biome-restricted species are not chosen. Some sites may, however, be chosen for one or a few species which would otherwise be under-represented such as those species confined to a relatively small part of the biome.
- Some EBAs and many biomes cross political boundaries; where so, the networks of sites should try to ensure that, as far as possible, all relevant species occur in IBAs in those countries where the EBA or biome is well represented. Thus, biomes require that the networks of sites, chosen by complementarity analysis, take account of both the geographical spread of the biome and the political boundaries that cross it.
- In practice, since many species in category A1, nearly all in A2 and some in A4 are restricted to one biome, it may be helpful to select sites under this category once the gaps in coverage of both species and geographical spread that result from application of the other categories have been analysed. This will not apply to those biomes that hold no or few A1, A2 or A4 species. The existing protected area network is a pragmatic starting point for choosing sites.

Category A4 Congregations

Criteria:

A site may qualify on any one of the four criteria listed below:

(i) Site known or thought to hold, on a regular basis, ≥ 1% of a biogeographic population of a congregatory waterbird species.

(ii) Site known or thought to hold, on a regular basis, ≥ 1% of the global population of a congregatory seabird or terrestrial species.

(iii) Site known or thought to hold, on a regular basis, ≥ 20,000 waterbirds or ≥ 10,000 pairs of seabirds of one or more species.

(iv) Site known or thought to exceed thresholds set for migratory species at bottleneck sites.

Notes

- This category applies to those species that are (perceived to be) vulnerable by congregation at valuable or sensitive sites when breeding or wintering or while on passage.
- The term 'waterbird' is used here in the same sense as the Ramsar Convention uses 'waterfowl' and covers the list of families as more precisely defined by Wetlands International (Rose & Scott 1994). Congregatory non-waterbird species (A4ii) includes both terrestrial species and those families of seabird not covered by Rose & Scott – Spheniscidae, Diomedeidae, Procellaridae, Hydrobatidae, Pelecanoididae, Phaethontidae, Sulidae, Fregatidae, Chionididae, Stercorariidae and Alcidae.
- The threshold for criterion A4(i) is 1% of the **biogeographic** population of a congregatory waterbird species. Relevant flyway populations are combined to produce biogeographic population estimates.
- 'Biogeographic' is approximately the equivalent of BirdLife's IBA regions but differs in some areas due to the geopolitical basis of the IBA coverage. This results in some complication in setting thresholds as does the way some flyway populations are shared between regions in either breeding or wintering ranges.
- Threshold figures are set for all congregatory waterbird species, including those for which none are currently recognised by Ramsar. Wetlands International have collaborated in generating numeric thresholds from range estimates and from unpublished population data.
- There is an apparent logical inconsistency between criteria A4(i), 1% of biogeographic population, and A4(ii), 1% of global population of seabirds. It was felt, however, that the alternative of using 1% of the global population for waterbirds would, as well as departing from Ramsar, have insufficient biological justification because of the way many migratory waterbird species are distributed and split into well-defined, discrete flyway populations. 1% of global population would have the effect of over-emphasising regional waterbird endemics since over much of their range many widely distributed species may rarely occur at concentrations of >1%. For species that are regional endemics the biogeographic and global populations are the same.

- Application of criterion A4(iii) is to be discouraged where data quality permits A4(i) and (ii) to be used.
- Feral populations of all qualifying species are, as far as possible, to be excluded when applying these criteria.
- This category also embraces sites over which migrants congregate e.g. before gaining height in thermals. Although it is the airspace here that is important, conservation of the land beneath it may be necessary to protect the site from threats such as hunting and the construction of radio masts etc. Also included here are migratory stop-over sites which may not hold spectacular numbers at any one time yet, nevertheless, do so over a relatively short period due to the rapid turnover of birds on passage.

General points

- *Definition of a site*

  It should, as far as possible,

  i) be different in character or habitat or ornithological importance from the surrounding area.

  ii) exist as an actual or potential protected area, with or without buffer zones, or be an area which can be managed in some way for nature conservation.

  iii) alone or with other sites, be a self-sufficient area which provides all the requirements of the birds (that it is important for) which use it during the time they are present.
- Where extensive tracts of continuous habitat occur which are important for birds, only characteristics ii) and iii) apply. This definition is not applicable to migratory bottleneck sites.
- Here also, it is not possible to give exhaustive guidelines and, again, practical considerations of how best the site may be conserved should be the foremost consideration.
- Simple, conspicuous boundaries such as roads, rivers, railway lines etc. may be used to delimit site margins while features such as watersheds and hilltops may help in places where there are no obvious discontinuities in habitat (transitions of vegetation or substrate). Boundaries of ownership are also relevant.
- There are no fixed size maxima or minima for IBAs; the biologically sensible has to be tempered with the practical. Neither is there a definitive answer of how to treat cases where a number of small sites neighbour each other. Whether these are best considered a series of separate IBAs or one large one containing areas lacking ornithological significance will depend upon local conservation realities.

3.3.5 Kenya's ornithological importance

Kenya has one of the richest avifaunas in Africa. One thousand and eighty-nine bird species are presently listed (OS-c 1996). At least six of these (Williams's Lark, Sharpe's Longclaw, Hinde's Babbler, Taita Thrush, Tana River Cisticola and Clarke's Weaver[1]) are national endemics (more are listed under some classifications). This high species total is due to Kenya's diverse habitats and the presence of four endemic bird areas and six avian biomes (Fishpool 1996; see below). Kenya is also on a major flyway of Palaearctic migrants, both land- and water-birds, mainly from eastern Europe, Russia, the Middle East and Siberia (Fanshawe & Bennun, 1991).

Around 170 of Kenya's bird species are Palaearctic migrants (11 of them with a local breeding population too) and 60 migrate regularly within the Afrotropics or from Madagascar (OS-c 1996). Some 335 of Kenya's bird species are found in forests; 230 are entirely forest-dependent, and 110 are 'forest specialists', requiring intact, undisturbed habitat (Bennun *et al.*, in press).

Collar & Stuart (1994) list 23 globally threatened species from Kenya (listed in Appendix 1). Four of these are critically endangered, two endangered and 16 vulnerable. One (the Tana River Cisticola) is classed as data-deficient. A further 16 species are classified as near-threatened.

An analysis of regionally threatened birds (Bennun & Njoroge 1996, Bennun *et al.*, in press) has shown that Aberdare Cisticola and Sharpe's Longclaw, two species not listed as threatened by Collar & Stuart, in fact meet the criteria for listing as globally vulnerable. For the IBA programme in Kenya these national endemics are classed as 'provisionally vulnerable' and used to delineate IBAs in a similar way to vulnerable species.

On the other hand, the official East African list (OS-c 1996, unpublished) does not recognise three critically endangered taxa – Kulal White-eye, Taita White-eye and Taita Apalis – as full species. The two Taita

[1]The scientific names of all bird species mentioned are given in the indexes.

Table 3
The categories under which Kenya's IBAs quality

Site code	Site names	Category A1	A2 KM	SP	EACF	T-MM	K&NF	NKSGP	A3 S-M	A4i
1	Aberdare Mountains	●	●							●
2	Kianyaga Valleys	●	●							
3	Kikuyu Escarpment Forest	●	●							●
4	Kinangop Grasslands	●	●							
5	Mt Kenya	●	●							●
6	Mukurweini Valleys	●	●							
7	Arabuko-Sokoke Forest	●			●					
8	Dakatcha Woodland	●			●					
9	Diani Forest	●								
10	Dzombo Hill Forest	●			●					
11	Gede Ruins National Monument	● ●								
12	Kaya Gandini	●			●					
13	Kaya Waa	●								
14	Kisite Island									
15	Kiunga Marine National Reserve									
16	Mida Creek, Whale Island & Malindi/Watamu Coast									
17	Marenji Forest	●			●					
18	Mrima Hill Forest	●								
19	Sabaki River Mouth									
20	Shimba Hills	●			●					
21	Taita Hills Forests	●				●				
22	Tana River Delta	●								
23	Tana River Forests	●			●					
24	Tsavo East National Park	●							●	
25	Tsavo West National Park	●							●	
26	Chyulu Hills Forests	●	●							
27	Dida Galgalu Desert	●						●	●	
28	Lake Turkana								●	
29	Machakos Valleys	●	●							
30	Masinga Reservoir									
31	Meru National Park								●	
32	Mwea National Reserve	●	●							
33	Samburu/Buffalo Springs National Reserves								●	
34	Shaba National Reserve	●						●	●	
35	Dandora Ponds									
36	Nairobi National Park	●	●							
37	Dunga Swamp	●								

Codes

A1	Globally-threatened species
A2	Restricted-range species
KM	Kenyan Mountains EBA
SP	Serengeti Plains EBA
EACF	East African Coastal Forests EBA
T-MM	Tanzania-Malawi Mountains EBA
K&NF	Kakamega and North Nandi Forests SA
NKSGP	North Kenya Short-grass Plains SA
A3	Biome-restricted Assemblages
S-M	Somali-Masai biome
AH	Afrotropical Highlands biome
G-CF	Guinea-Congo Forests biome
EAC	East African Coast biome
LVB	Lake Victoria Basin biome
SGS	Sudan and Guinea Savannah biome
A4	Congregations
A4i	At least 1% of biogeographic population of a waterbird
A4ii	At least 1% of global population of a terrestrial bird
A4iii	More than 20,000 waterbirds

EAC	LVB	G-CF	SGS	A4 A4i	A4ii	A4iii	Site code	Site names
							1	Aberdare Mountains
							2	Kianyaga Valleys
							3	Kikuyu Escarpment Forest
							4	Kinangop Grasslands
							5	Mt Kenya
							6	Mukurweini Valleys
●							7	Arabuko-Sokoke Forest
							8	Dakatcha Woodland
							9	Diani Forest
							10	Dzombo Hill Forest
							11	Gede Ruins National Monument
							12	Kaya Gandini
							13	Kaya Waa
				●			14	Kisite Island
				●			15	Kiunga Marine National Reserve
				●			16	Mida Creek, Whale Island & Malindi/Watamu Coast
●							17	Marenji Forest
●							18	Mrima Hill Forest
				●			19	Sabaki River Mouth
●							20	Shimba Hills
							21	Taita Hills Forests
●				●		●	22	Tana River Delta
●							23	Tana River Forests
							24	Tsavo East National Park
							25	Tsavo West National Park
							26	Chyulu Hills Forests
							27	Dida Galgalu Desert
				●		●	28	Lake Turkana
							29	Machakos Valleys
				●		●	30	Masinga Reservoir
							31	Meru National Park
							32	Mwea National Reserve
							33	Samburu/Buffalo Springs National Reserves
							34	Shaba National Reserve
				●			35	Dandora Ponds
					●		36	Nairobi National Park
	●						37	Dunga Swamp

Table 3
The categories under which Kenya's IBAs qualify

Site code	Site names	Category A1	A2 KM	A2 SP	EACF	I-MM	K&NF	NKSGP	A3 S-M	A3 AH
38	Koguta Swamp	●								
39	Kusa Swamp	●								
40	Ruma National Park	●								
41	Yala Swamp	●								
42	Amboseli National Park								●	
43	Cherangani Hills									●
44	Lake Baringo								●	
45	Lake Bogoria National Reserve	●								
46	Lake Elmenteita	●	●	●						
47	Lake Magadi									
48	Lake Naivasha	●		●						
49	Lake Nakuru National Park	●		●						
50	Masai Mara	●	●	●						
51	Mau Forest Complex									●
52	Mau Narok/Molo Grasslands	●	●							
53	North Nandi Forest	●								
54	Ol Donyo Sabache	●								
55	South Nandi Forest	●								
56	South Nguruman	●	●	●						
57	Busia Grasslands	●								
58	Kakamega Forest	●								
59	Mt Elgon	●	●							●
60	Sio Port Swamp	●								

Codes

A1	Globally-threatened species	AH	Afrotropical Highlands biome
A2	Restricted-range species	G-CF	Guinea-Congo Forests biome
KM	Kenyan Mountains EBA	EAC	East African Coast biome
SP	Serengeti Plains EBA	LVB	Lake Victoria Basin biome
EACF	East African Coastal Forests EBA	SGS	Sudan and Guinea Savannah biome
T-MM	Tanzania-Malawi Mountains EBA	A4	Congregations
K&NF	Kakamega and North Nandi Forests SA	A4i	At least 1% of biogeographic population of a waterbird
NKSGP	North Kenya Short-grass Plains SA	A4ii	At least 1% of global population of a terrestrial bird
A3	Biome-restricted Assemblages	A4iii	More than 20,000 waterbirds
S-M	Somali-Masai biome		

EAC	LVB	G-CF	SGS	A4i	A4 A4ii	A4iii	Site code	Site names
	●						38	Koguta Swamp
	●						39	Kusa Swamp
							40	Ruma National Park
	●						41	Yala Swamp
							42	Amboseli National Park
							43	Cherangani Hills
							44	Lake Baringo
				●		●	45	Lake Bogoria National Reserve
				●		●	46	Lake Elmenteita
				●		●	47	Lake Magadi
				●		●	48	Lake Naivasha
				●		●	49	Lake Nakuru National Park
							50	Masai Mara
							51	Mau Forest Complex
							52	Mau Narok/Molo Grasslands
		●					53	North Nandi Forest
							54	Ol Donyo Sabache
		●					55	South Nandi Forest
							56	South Ngaruman
			●				57	Busia Grasslands
		●					58	Kakamega Forest
			●				59	Mt Elgon
	●						60	Sio Port Swamp

species co-occur with Taita Thrush, which has full species rank, so taxonomic approach makes no difference to the listing of the Taita Hills forests as an IBA. The case of Mt Kulal is less clear-cut. Unlike the Taita Hills, Mt Kulal is not a centre of endemism, and the taxonomic status of its endemic bird taxon, the Kulal White-eye is unclear. It is not generally regarded as a full species, and there are even doubts whether it is most closely related to the Montane White-eye or the Yellow White-eye (which occurs in nearby forest 'islands') (L. Borghesio, pers. comm.). Until further taxonomic information is forthcoming, we prefer to maintain Mt Kulal on the list of potential IBAs.

Several Endemic Bird Areas and Secondary Areas occur in Kenya (Stattersfield *et al.* 1998). The two most important are the Kenya Mountains EBA and the East African Coastal Forests EBA. Kenya holds all the restricted-range species (nine and seven, respectively) in both these EBAs. Kenya also includes smaller portions of three other EBAs: the Tanzania-Malawi Mountains (three out of 37 species, all in the Taita Hills), the Serengeti Plains (two out of six species), and the Jubba and Shabeelle Valleys (one out of five species; this EBA barely touches Kenya in the extreme north-east of the country). The Taita Hills are geologically the northernmost representatives of the Eastern Arc mountains of Tanzania and Malawi, but have no restricted-range bird species in common with the rest of the EBA.

Secondary areas include the Kakamega and Nandi Forests (with Chapin's Flycatcher), the North Kenyan Short-grass Plains (Williams's Lark) and Mt Kulal (Kulal White-eye – but see above).

Kenya includes portions of no fewer than six avian biomes. The most significant are the Somali–Masai biome (Kenya has 92 of its 130 species), the East African Coast biome (30/36 species), the large Afrotropical Highlands biome (67/224 species) and the small Lake Victoria Basin biome (9/12 species). The easternmost outliers of the Guinea–Congo Forests biome also occur in Kenya (43/278 species), along with a small portion of the Sudan and Guinea Savannah biome (13/54 species).

Kenya holds many sites that are important for congregatory birds. The coast, with its creeks, reefs and beaches, is a major flyway for migratory waterbirds from the Palaearctic, as is the chain of lakes stretching along the rift valley from Turkana in the north to Magadi in the south. The rift's alkaline lakes also provide periodic feeding stations for enormous numbers of Lesser Flamingos. Several small coral islands off the coast shelter important breeding colonies of Roseate Terns and other seabirds.

3.3.6 Selection of sites

Listing of IBAs began with Categories A1 (threatened species) and A4 (congregatory species). These categories have criteria that are particularly straightforward to apply, and overlap little with each other.

Unfortunately, full bird species lists are available for only a few sites in Kenya (e.g. Samburu and Shaba National Reserves: Finch *et al.* 1989; Nairobi National Park: Harvey 1997; Tsavo East National Park: Lack *et al.* 1980). For other sites within the protected area network, we generated lists of restricted-range and biome-restricted species using data from the Bird Atlas of Kenya (Lewis & Pomeroy 1989), supplemented by updated atlas square data and biogeographic records held on the Ornithology Department databases. Additional information came from distributional accounts in Britton (1980) and Zimmerman *et al.* (1996). The 'raw' atlas square lists were checked against the habitat available in each site to remove unlikely species, and circulated among those familiar with the particular sites for further checking. Finally, we examined the distribution of restricted-range and biome-restricted species among sites to select IBAs for listing.

The sites selected for Categories A1 and A4 already covered the great majority of restricted-range and biome-restricted species adequately. Only a few additional sites were listed solely on the basis of their biome-restricted birds (Category A3). These included, for example, Samburu and Buffalo Springs National Reserves and Amboseli National Park for the Somali-Masai biome, and Cherangani Hills and Mau Forest Complex for the Afrotropical Highlands biome. Other sites were listed under Category A3 in addition to other categories if they held more than 35% of Kenya's complement of bird species restricted to a particular biome. This cut-off point was raised to 55% in the case of the Afrotropical Highlands biome, where a suite of widespread species occurs in many sites. In the end, no site was listed **only** for its restricted-range birds (Category A2); these species were all covered adequately by sites listed for threatened or biome-restricted species.

We did not list sites under Category A2 if they contained only one restricted-range species that was present at many sites.

The final site network does not include every single biome-restricted species (see also below). We did not attempt to select sites solely for species whose Kenyan range is marginal, under the rationale that these birds are best conserved in other countries.

Delineating the boundaries and defining the areas of some IBAs was problematic. These problems were of two main kinds:
(1) Lack of distinct boundaries, or lack of information about the extent of a site. Where necessary, boundaries were arbitrarily defined using mapped geographical features (for instance, the depression contour and cliffs in the case of Lake Baringo, IBA 44). No delineation of boundaries could be made for the Dida Galgalu Desert (IBA 27). Generally, IBA boundaries have been defined so as to demarcate an area that is potentially amenable to conservation. Thus many sites are congruent with existing protected areas. Some, like the Masai Mara, include buffer zones as well.

(2) Locations where the habitat is fragmented. In some cases, such as the Taita Hills Forests, many small sites could potentially have been listed separately. Instead, these fragments have been combined together into a single IBA. In the Taita Hills Forests and Busia Grasslands, small islands of natural habitat are surrounded by an agricultural matrix. Here the site boundaries follow the boundaries of the habitat islands, and are thus discontinuous. In the Tana River Forest, the matrix is predominantly of natural habitats. Here the site boundary has been set to include all the forest patches together with the matrix in-between.

3.3.7 The IBA network

Sites list

The final list of 60 IBAs is shown in Table 1, which gives summary information about each. Sites are listed alphabetically within provinces. (Some sites overlap provinces. Where it is not obvious which province contains the bulk of a site, such sites are classed with the province that comes first in the alphabet.) Each site has been given a unique site number according to its position in the list; these range from 1–60. The map on page 6 shows the location of all IBAs in relation to existing protected areas and natural features.
Table 3 indicates in more detail the category or categories under which particular sites qualify. Substantially more sites are listed for globally-threatened species (Table 4) than for any other single category. However, 42 sites (70%) are listed for more than one category.

Geographical distribution and habitat

Table 5 shows the number of IBAs in each of Kenya's eight provinces (eight sites overlap provinces). The larger provinces generally contain more IBAs, with Rift Valley in the lead, but there is a noticeable concentration of sites in Coast Province and none listed for North-eastern Province. North-eastern is a large province that has rather uniform topography and habitat; most bird species that occur there are widespread, and it is difficult to define particular areas that are more important than others for bird conservation. Data from this province are also scanty. With more information, sites such as Malkamari National Park may qualify as IBAs (it is placed on the shadow list at the moment).

Divided by broad habitat types, forests form the single largest group with wetlands close behind (Table 6). Only 35 IBAs, slightly over half, are in protected areas, meaning that 25 have no official protection. Most of the forest, and a majority of the savanna sites, already have some form of official protection. Wetlands and moist grasslands are less well taken care of, a reflection of past gazettement policies that concentrated on importance for large mammals (especially in inhospitable areas), timber extraction and catchment protection. Two major habitat sub-types, montane grassland (IBAs 4 and 5) and papyrus swamps (IBAs 37, 38, 39, 41 and 60) lie outside protected areas entirely.

Being in a protected area does not guarantee that a site is adequately protected, however. Almost all the forest IBAs are gazetted, but more than three-quarters (77%) are severely or critically threatened (see below for a more detailed analysis of threats). Moist grassland and 'other' habitats (specifically, river valleys in central Kenya) are even more generally threatened. Very few savannah sites are under serious threat, and the majority (56%) of wetlands are also in the lower threat classes, despite a lack of official protection.

The IBA map shows clearly that IBAs are not uniformly distributed across the country. The general

Table 4

The number of IBAs in each category
(24 sites are listed in two
and 18 in three categories)

Category	Number of sites	Number of sites in this category alone
A1 Globally-threatened species	46	5
A2 Restricted-range species	29	1
A3 Biome-restricted species	32	0
A4 Congregations	13	8

picture is of a few large sites in the semi-arid parts of the country, and many, often smaller sites in the higher rainfall areas – which, unsurprisingly, is where all of the forests and moist grassland, and many of the wetlands, occur. These parts of Kenya are also densely populated, generally with intense pressure on natural resources. This has obvious implications for the conservation of many IBAs.

Sizes

Kenya's 60 IBAs cover a total area of c. 5.7 million ha (taking a notional area of 250,000 ha for the Dida Galgalu desert). This is about 10% of Kenya's land area. However, the size of sites varies over seven orders of magnitude, from as small as 1 ha to more than 1 million ha. The median size is 18,300 ha, while the mean size is 95,200 ha – showing the disproportionate effect of a few very large sites (Figure 1).

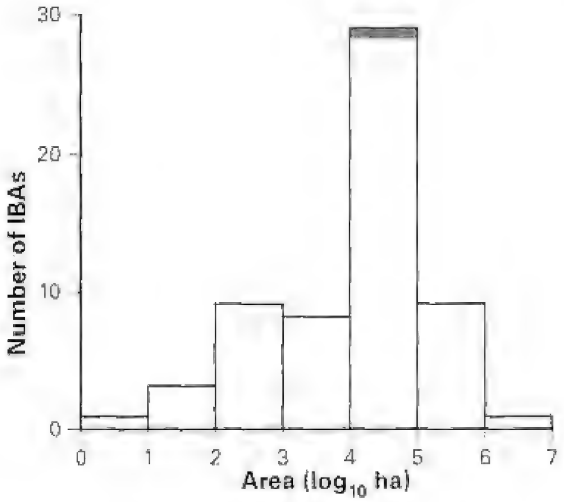


Figure 1
Areas of Kenya's 60 IBAs. The logarithmic scale on the horizontal axis ranges from 1 ha to 10 million ha

Although the land area covered by the set of IBAs is substantial, most of this (72.8%) is already within protected areas (PAs). Only around 1.5 million ha extra would be required to protect the 25 sites that are not yet gazetted as some type of reserve. Sites outside PAs are also on average only about half the size of those within PAs (62,080 ha vs 118,800 ha). An additional 20 sites could be brought into the PA network by acquiring just 240,000 ha of land.

In practice, the chances of gazetting new PAs in Kenya are usually likely to be poor. For the majority of unprotected sites other forms of conservation must thus be pursued.

Gaps in coverage

Appendices 1 – 4 show our current knowledge of the distribution of threatened, restricted-range, biome-restricted and congregatory species (exceeding threshold values) among Kenya's IBAs. Sites where a species has been recorded regularly are shown with a closed circle; an open circle indicates that the species is only a vagrant or irregular visitor. The following species occurring in Kenya and listed by Fishpool (1996) are not adequately covered by the present IBA network:

Globally-threatened species

Shoebill: This species has occurred in three IBAs but is only a vagrant to Kenya.

Table 5
The number of IBAs per province
(eight sites overlap provinces)

Province	Number of IBAs
Rift Valley	20
Coast	19
Eastern	11
Central	6
Nyanza	5
Western	5
Nairobi	2
North-eastern	0

Table 6
Kenya's IBAs and their level of protection and threat, by dominant habitat

Dominant habitat	Number of sites	Number in protected areas	Number severely or critically threatened
Forest	22	20 (91%)	17 (77%)
Wetland	18	5 (28%)	8 (44%)
Bushland, semi-arid or arid	12	7 (58%)	1 (8%)
Moist grassland	6	3 (50%)	5 (83%)
Other	2	0 (0%)	2 (100%)
Total	60	35 (58%)	33 (55%)

Tana River Cisticola: The status and distribution of this data-deficient species are unknown, which makes conservation action difficult! It is thought likely to occur in bushland around the Tana River Forests (IBA 23).

Kulal White-eye: This is not recognised as a full species in the region, and Mt Kulal (where it occurs) is not listed as an IBA for the time being. (See above.)

Regionally-threatened species

The IBA criteria do not make provision for regionally-threatened species (in part because there are few regional red lists drawn up yet). However, the Kenyan IBA network provides good coverage of regionally-threatened species (Bennun & Njoroge 1996). Those not properly covered at the moment include:

Orange River Francolin: This species is at the edge of its range in Kenya, where it is known from the Huri Hills and Mt Kulal.

Rock Pratincole: Resident along the Nzoia River in western Kenya, but not elsewhere in the country. This site does not qualify as an IBA on present information.

Shining-blue Kingfisher: Has been recorded at Mungatsi in the Busia Grasslands (IBA 37) and at Kakamega Forest (IBA 38). This species is at the edge of its range in Kenya and probably not resident.

Forest Wood-hoopoe: Formerly recorded from Mt Elgon, probably now extinct in Kenya due to deforestation.

Collared Lark: A Somali-Masai biome species that is confined to the dry Horn of Africa. This lark is locally common in Somalia; there are scattered records across the north-east of Kenya, but here it is scarce.

Heuglin's Masked Weaver: A Sudan-Guinea Savannah biome species that is at the extreme eastern end of its range in Kenya. There have been sporadic records from a few sites in western Kenya, including one potential IBA (the Kongelai Escarpment).

Restricted-range species
Kulal White-eye: See above.

Juba (or Salvadori's) Weaver and African White-winged Dove (or White-winged Collared-dove): Both these species occur in the Jubba and Shabeelle valleys Endemic Bird Area (Stattersfield *et al.* 1998) and are recorded in Kenya along the Daua River, where they are locally common. Kenya has only a very small section of this IBA, along the Ethiopia-Kenya border in the extreme north-east of the country. The main conservation responsibility for these and the other restricted-range species in this EBA rests with Ethiopia and Somalia. Malkamari National Park is thought likely to contain both the dove and the weaver and is listed as a potential IBA pending confirmation of their presence.

Biome-restricted assemblages
Somali-Masai biome
For African White-winged Dove, Collared Lark and Juba Weaver, see above. Two other species of north-eastern Kenya are not represented in the present IBA network: Gillet's Lark and Rüppell's Weaver. Both are mainly Somali birds, known in Kenya only from very few records in the extreme north-east of the country.

Afrotropical Highlands biome
For Kulal White-eye, see above.

Sudan and Guinea Savannah biome
This biome is marginal in Kenya, which is at its extreme eastern limit. Four species, White-crested Turaco, Red-pate Cisticola, Bronze-tailed Starling and Chestnut-crowned Sparrow Weaver, are not recorded in any Kenyan IBA. Three of them occur on or around the Kongelai Escarpment, a potential IBA. Further survey work in the Kongelai Escarpment is desirable.

3.4 Conservation issues

The overriding problem facing Kenya's IBAs is degradation and loss of habitat. This is coming about for a variety of reasons, detailed in the individual site accounts. A growing population is exerting more and more pressure for land in agriculturally productive areas. Despite the many essential ecological services that forests provide, forest reserves in many parts of the country are being eaten away by official de-gazettement. This process is particularly unsatisfactory for several reasons. Even if all forest was converted to farms, the amount of land would be inadequate to solve the problem of landlessness. The de-gazettement process is driven by political, not environmental, considerations, and no thought is given to the conservation value of areas being excised. Finally, land is rarely allotted to those who most need it, so pressure on the forests is not even temporarily alleviated.

Wetlands are also vital for their environmental services, but many sites, such as Yala Swamp, are under threat of conversion to agriculture. This generally makes little economic sense in the long term, but the values of wetlands are still poorly documented and even more poorly understood by decision-makers.

These threats to sites, arising through official processes, represent failures of environmental policy. Conversion of habitat is also taking place in other ways. At many forest sites there has been substantial illegal encroachment in recent years: Kakamega (IBA 58), South Nandi (IBA 55) and Mt Kenya (IBA 5) are all clear examples. The economics of milk and crop production are driving the conversion of montane grassland, almost all on private land, to cultivated fields. The remnant moist grassland in the west of the country is being turned into sugar cane fields for similar reasons. Economic forces are also leading to the loss of migration routes and buffer zones for protected areas such as Nairobi National Park and the Masai Mara National Reserve.

Where habitat is not being lost outright, degradation is often a problem. This takes many forms, ranging from overgrazing and soil erosion in semi-arid areas, to removal of tussock grass species in montane grasslands, excessive abstraction of water from wetlands and tree poaching and cattle grazing in forests. Degradation is obviously less damaging than outright habitat loss; given time and protection, most habitats can recover, at least partially. However, it can also lead to the loss of both species and environmental benefits. Management is particularly poor in many forest reserves, and degradation due to uncontrolled use represents a serious threat.

Other threats are less widespread, but may create serious problems for particular sites. These include:

- alien species, such as the Nile Perch *Lates niloticus* and Water Hyacinth *Eichhornia crassipes* in Lake Victoria and Louisiana Red Crayfish *Procambarus clarkii* in Lake Naivasha (IBA 48). These can cause great disruption to the existing ecosystem.
- pollution by agro-chemicals or industrial wastes. This is a growing problem at many wetland sites, and inadequately controlled by existing enforcement mechanisms (discussed below).
- hunting (usually illegal). In Kenya this is more of a problem for large mammals than birds, but it has severe consequences for a few threatened species such as Hinde's Babbler.

3.5 The institutional, legislative and policy framework for biodiversity conservation in Kenya

3.5.1 Institutional structures

In Kenya a number of government departments and organisations have partially overlapping responsibilities for planning, co-ordinating, implementing and monitoring government policies and legislation on the environment. NBU (1992) lists no fewer than 38 Government ministries, departments, and parastatal organisations that are involved in biodiversity-related work in Kenya. The mandates for different facets of environmental management change as ministries are created and others abolished, and the limits of institutional responsibility are not always clear.

An Inter-Ministerial Committee on the Environment (see below) has responsibility for helping to co-ordinate institutional roles. In addition, institutions and departments may draw up and sign Memoranda of Understanding (MoUs) allowing co-operation where their responsibilities overlap. The most significant example is the MoU between the Forest Department and the Kenya Wildlife Services (recently joined by the National Museums of Kenya and Kenya Forestry Research Institute, which both have research programmes in forests). The MoU allows for joint management, and research collaboration, at specific forest reserves. These include a number of IBAs such as Kakamega (IBA 58), Aberdares (IBA 1), Mt Kenya (IBA 5) and Arabuko–Sokoke (IBA 7).

Many non-government organisations, both international and national, play important roles in biodiversity conservation in Kenya. Among others, these include the African Conservation Centre (ACC, a branch of Wildlife Conservation International), African Wildlife Foundation (AWF), East African Wildlife Society (EAWLS), Friends of Conservation (FoC), Kenya Environmental NGOs (KENGO), Nature Kenya (the East Africa Natural History Society – EANHS), World Conservation Union (IUCN), Wildlife Clubs of Kenya (WCK) and World Wide Fund for Nature (WWF). IUCN and WWF are global organisations, while ACC, AWF and FoC operate regionally but are linked to parent organisations abroad. The EAWLS and Nature Kenya are conservation societies, Nature Kenya also being the national Partner of a global conservation organisation, BirdLife International.

At the time of writing, the following ministries (and their relevant departments) played a major role in biodiversity conservation:

1. *Ministry of Tourism and Wildlife*: This ministry is responsible for wildlife conservation (discussed in section 3.5.4) and oversight of the tourism industry. Under this Ministry falls the Kenya Wildlife Service (KWS), responsible for the country's protected wildlife species, and for the management of National Parks in particular. KWS is a parastatal or state corporation, meaning that it has substantial financial and operational autonomy.

2. *Ministry of Natural Resources*: This ministry is responsible for regulating forestry (discussed in section 3.5.5), fisheries and mining. The Forest and Fisheries Departments fall under this Ministry. The Forest Department (FD) is responsible for both indigenous and plantation forests countrywide.

2. *Ministry of Environmental Conservation*: This is the ministry that initiates environmental policies, co-ordinates the activities of sectoral agencies and advises the government on environmental issues. The ministry administers the forestry act and mining act. The National Environment Secretariat (see section 3.5.2), also a department in this ministry, co-ordinates environmental policies and activities in the country through an Inter-Ministerial Committee on the Environment. This Ministry has posted District Environmental Protection Officers to most districts.

3. *Ministry of Home Affairs, Culture and National Heritage*: This is the parent ministry for the National Museums of Kenya, which has an extensive biological resources programme. The programme focuses on protecting Kenya's indigenous flora and fauna through education, research, curation and both *ex-situ* and *in-situ* conservation.

4. *Ministry of Local Government*: Under this ministry fall a variety of local authorities. Many of these are responsible for administering national reserves and forest reserves, and regulating land-use through appropriate bye-laws within their areas of jurisdiction. They also have responsibilities for water conservation and pollution control under both the Public Health Act and the Local Government Act.

5. *Ministry of Planning and National Development:* This Ministry is responsible for integrating ecological aspects into national development planning. Through the Department of Resource Surveys and Remote Sensing, the Ministry inventories and monitors the status of natural resources.

6. *The Office of the President:* This office co-ordinates the policy on development programmes. Under this office falls the Permanent Presidential Commission on Soil Conservation and Afforestation, which is responsible for co-ordinating all activities related to soil and water conservation and afforestation programmes, and which is represented by District Environment Officers in most districts.

7. *Ministry of Agriculture:* This Ministry administers the Agriculture Act and the Pest Control Act, through which it has established District Conservation Committees responsible for ensuring proper land-use practices.

8. *Ministry of Water Development:* This Ministry is responsible for planning, development and utilisation of the country's water resources, conservation of water catchment areas and water pollution control.

9. *Ministry of Research, Science and Technology:* This Ministry promotes research activities in science and technology. It is responsible for several research institutions relevant to biodiversity conservation, such as the Kenya Forestry Research Institute.

3.5.2 Conservation legislation and policy

A full review of the complex legislation and policy governing environmental conservation in Kenya is beyond the scope of this directory. Our aim is to give an outline of the overall framework and its strengths and weaknesses – especially where bird and biodiversity conservation are concerned. Legislation that is particularly relevant is outlined briefly, together with a description of the implementing agencies and their current policies. Further information can be found in NBU (1992), NEAP (1994), Wass (1995) and the relevant Acts.

Conservation action in Kenya is carried out within a framework of legislation established by the Kenya government. This legislation is piecemeal in nature, highly sectoral, substantially overlapping and sometimes inherently contradictory. There exists separate legislation to regulate the exploitation of land, water, forest resources, minerals, wildlife and fisheries.

There are at least 77 statutes that bear on environmental issues (listed in NEAP, 1994). Those relating directly to conservation include the Wildlife Act, the Forestry Act, the Antiquities and Monuments Act and the Fisheries Act. Other legislation does not deal explicitly with biodiversity but substantially affects its conservation: for example, the Chiefs' Authority Act, Water Act, Agriculture Act, Trust Land Act, Land Adjudication Act, Registered Land Act, Timber Act and Trespass Act.

Several Presidential directives also touch on conservation issues, for example the Presidential decree that bans the felling of indigenous trees. However, these directives are often difficult to implement because of the lack of separate legislation to enforce them.

The sectoral approach to natural resource management has many disadvantages. It produces problems of co-ordination of policies, jurisdictional overlaps and conflicts, and at times bureaucratic inertia (NBU 1992). It ignores the fact that ecosystems cannot easily be partitioned into independent units, but must be treated as a functional whole. The implementation and execution of the various Acts and policies falls to numerous government departments. Co-ordination of environmental conservation remains weak, with the different institutions working in isolation and often creating conflicting policies and programmes (NEAP 1994). The National Environmental Secretariat (NES, now within the recently-created Ministry of Environmental Conservation) was established in 1974 to act as a focal co-ordinating body and advise the government on issues concerning environmental management. However, NES remains without legislative back-up and independent authority, which considerably diminishes its effectiveness. The Permanent Presidential Commission on Soil Conservation and Afforestation (PPSCA, under the Office of the President) also has limited capacity to co-ordinate efforts in its area of responsibility. It too lacks a legal base and has a narrow mandate and few operating resources.

Historically, Kenya's legislation has been mainly oriented towards exploitation. Over time, regulations that mitigated the adverse environmental consequences of exploitation have been added as amendments. For example, a set of land preservation requirements in the Agriculture Act were added because of concern about severe environmental degradation resulting from inappropriate agricultural practices. In the wildlife and forestry sector the

legislative policy was aimed at preserving species and ecosystems, assuming no human activity.

Kenya's environmental legislation is inherited from the colonial era and takes a 'command and control' approach (for example, in the regulations forbidding most local uses of forest reserves). This is a major drawback for obtaining environmental sustainability through public participation and co-operation. On the other hand, existing laws do allow public agencies to make binding legal decisions on the basis of broad discretionary powers (NBU 1992). Potentially, this should allow considerable flexibility to adjust regulations to changing socio-economic and ecological circumstances. New policies that have recently been drafted (though not implemented) for wildlife and forest resources take advantage of this to adopt a more participatory approach. However, the constraints imposed by existing laws make it difficult to go as far as might be desired in this direction.

There is a wide range of legislation for environmental management in Kenya, yet large-scale environmental degradation continues. This is more the result of institutional weaknesses and failures of co-ordination than of legislative inadequacies. Many legal prohibitions are in any case likely to be ineffective. Scarcity of land, rapid population growth and highly skewed access to resources force many people to ignore the long-term sustainable use of the environment. There is little awareness among the rural population or among politicians of the importance of environmental conservation. New integrated legislation on the environment is under active discussion at present. Properly drafted, a comprehensive Environment Act would represent a great improvement on the present situation. However, further legislation alone will not address the underlying problems.

3.5.3 Land tenure and land use

Despite the continued absence of a consolidated environmental legislation, there are wide-ranging legal provisions for the protection and proper use of land (NEAP 1994). These are scattered among a variety of statutes.

Government land is land owned by the Government of Kenya under the Government Lands Act (Cap. 280). This includes, for example, gazetted National Parks and Forest Reserves. The Government Lands Act allows the President, through the Commissioner of Lands, to allocate any unalienated Government land to any individual. In practice, such allocations have often been made without proper regard to social and environmental factors.

Trust land is land held and administered by various local government authorities as trustees under the constitution of Kenya and the Trust Land Act (Cap. 288). National Reserves and local sanctuaries, as well as County Council forest reserves, fall on trust land. Individuals may acquire leasehold interest for a specific number of years in trust land, though the land can (in theory) be repossessed by the local authorities should the need arise. Local authorities also retain certain regulatory powers over trust land.

Private land is land owned by private individuals under the Registered Land Act (Cap. 300). On registration as the land owner, an individual acquires absolute ownership on a freehold basis. The use of private land may, however, be limited by provisions made in other legislation, such as the Agriculture Act (Cap. 318). For instance, to protect soils the clearing of vegetation may be prohibited, or the planting of trees required. Land preservation orders issued by the Director of Agriculture can cover a whole range of other measures. The Chief's Authority Act (Cap. 128) provides further powers for administrative officials to undertake measures to conserve natural resources. A Permanent Presidential Commission on Soil Conservation and Afforestation is in place to help co-ordinate and advise on appropriate land use. However, as noted above, the 'command and control' approach of the law makes its effective implementation difficult, and widespread land degradation continues.

A special form of protection for any category of land is provided by the Antiquities and Monuments Act (Cap. 215). This provides for protection of sites of archaeological or palaeontological interest as National Monuments managed by the National Museums of Kenya – with appropriate restrictions on how the land can be used. This has led in the past to incidental conservation of biodiversity at relatively small sites such as Gede (IBA 11) or Olorgesailie. More recently, a number of 'kaya' forests (of cultural and religious significance to the Mijikenda people of Kenya's coast) have been protected effectively under this legislation.

3.5.4 Wildlife management

Background

The 1975 Wildlife Management Policy in Kenya set out a new, integrated approach to wildlife conservation based on local participation in all forms of wildlife utilisation. The policy defined the returns from conservation of habitats and their wildlife on a broad scale, as aesthetic, cultural and scientific as well as economic. It also recognised that wildlife needs space outside protected areas if it is to flourish without intensive management or loss of biodiversity. This space is available on private or communal land adjacent to the protected areas, where some landowners are willing to accommodate wildlife as a form of land use.

Implementation of the 1975 policy did not succeed, mainly as a result of escalating wildlife poaching and overall poor management. In 1989, the government replaced the Wildlife Conservation and Management Department with the Kenya Wildlife Service, a parastatal body. As a parastatal, KWS enjoyed more financial and operational independence from central government than its predecessor. Since 1989, strong donor support has helped to bring about substantial improvements in park management, anti-poaching, tourist security and staff morale.

However, KWS itself has faced a number of institutional and policy problems. In particular, the extent of its role outside protected areas has been controversial. New commitments beyond the parks and staff re-structuring proved expensive. When combined with a slump in tourism (and hence park gate revenues) in 1997/8, this brought the institution to the brink of insolvency and compromised many operations. It remains to be seen whether KWS can solve its internal financial and management problems and resume effective management of the country's wildlife.

The Wildlife Conservation and Management Act

This act provides the legal guidelines for the protection, conservation and management of wildlife in Kenya. It covers all matters relating to Kenya's wildlife, including protected areas, activities within protected areas, control of hunting, import and export of wildlife, enforcement and administrative functions of wildlife authorities. The act (as amended in 1989) sets up the Kenya Wildlife Service to implement its provisions.

The act allows the establishment of national parks, national reserves and local sanctuaries (the last two categories being under local authority control), as well as sanctuaries on private land. It also empowers the minister in charge of wildlife in Kenya to alter park boundaries, and to de-gazette national parks through a stipulated procedure. Importantly, this procedure requires explicit approval by the National Assembly following a 60-day notification period. Arbitrary or whimsical de-gazettement of national parks is thus unusual, in contrast to the situation for forest reserves (see below).

Under the act, national parks are managed by KWS through regulations that prohibit various activities within them. Regulations for specific national reserves and local sanctuaries are to be drawn up in consultation with local authorities. The act also provides for the partial or complete protection of particular animals. These are mainly mammals and birds, though in an amendment in 1981 several species of reptiles (notably marine turtles), amphibians and butterflies were included. The act does not mention any protected plant species, though plants (and particularly forests) that occur within national parks are protected. The remainder of Kenya's plant and animal species are ignored. Other regulations covered by the act include control of hunting through licensing, control and administration of trophies and game meat acquired through hunting. Also included are law enforcement regulations and penalties for offences committed within national parks.

Birds in wildlife legislation and policy

Birds are well covered by wildlife law in Kenya. All species are given full legal protection, except for those explicitly classified as either game birds or pests. Pests comprise species of quelea *Quelea* and mousebird *Colius* (in fact, only one species in each genus causes serious crop losses, but no species is under any conservation threat). Gamebird hunting stopped when sport hunting of wildlife species was banned in 1977. It was reintroduced in 1984 by legal notice. Properly managed, this activity can be of direct economic benefit to rural communities, and provide them with an incentive to conserve gamebirds and their habitats (Simiyu & Bennun, in press). However, this presupposes accurate information about the birds' demography, and a management system that both controls the hunting effectively and channels economic benefits to the local communities. Neither of these is presently in place, although

experimental systems are being tested at the local level (Simiyu & Benmun, in press).

Gamebirds include all Anatidae (geese and ducks), Phasianidae (quail, francolins and spurfowl), Numididae (guineafowl), Turnicidae (button quail), Gallinaginae (snipe), Pteroclididae (sandgrouse) and Columbidae (pigeons and doves). Small bustards (genus *Eupodotis*) are also listed. In practice, bustards and other regionally threatened birds (such as Maccoa and White-backed Duck) are not presently hunted.

Although birds and mammals are given equal protected status in Kenya, mammals have formed the near-exclusive concern of the Kenya Wildlife Service and its predecessors.

Wildlife policy directions

KWS has drafted a new wildlife policy to replace that produced in 1975. The new policy takes into account the crucial importance of biodiversity for sustaining human life, as well as the increasing conflicts between wildlife and people. It has the following mission statement:

'The government of Kenya holds in trust for the present and future generations nationally and globally the biological diversity represented by its extraordinary variety of animals, plants and ecosystems ranging from coral reefs to alpine moorlands and from deserts to forests. Special emphasis is placed on conserving Kenya's unique assemblage of large mammals found in few other places on earth.'

The policy supports a conservation approach based on the integration of biological diversity and human activity. It recognises that the principal guardians of wildlife and those who decide its fate should be the primary beneficiaries of conservation. The benefits associated with biodiversity are set out as economic, cultural, recreational, aesthetic, scientific and environmental.

This draft policy was prepared in 1997. In 1998, KWS underwent a change of Directors. The organisation's focus reverted to management of wildlife in protected areas, with less attention and fewer resources being directed to so-called 'community wildlife' issues. It is as yet unclear how this change will affect the written wildlife policy.

3.5.5 Forest management

The Forests Act

The Forests Act, Cap. 385 (revised 1992), provides the basic legal guidelines for reservation, management and exploitation of forests and their resources. This act gives the government absolute control of forests through gazettement. It gives legal guidelines in the following major areas:

1. Gazettement, alteration of boundaries and de-gazettement of Forest Reserves (Section 4).

2. Declaration of Nature Reserves within Forest Reserves, and regulation of activities within Nature Reserves (Section 5).

3. Issuance of licenses for activities within Forest Reserves (Section 7).

4. Prohibition of activities in Forest Reserves (removal of forest produce, grazing, cultivation, hunting, etc.) or Government land generally (removal of trees, collection of honey, lighting of fires), except under licence from the Director of Forestry (Section 8).

5. Enforcement of the provisions of the Act, penalties and powers afforded to enforcing officers (Sections 9–14).

6. The power of the Minister to make rules with respect to sale and disposal of forest products, use and occupation of land, licensing and entry into forests (Section 15). This prerogative has been taken with the Forest (General) Rules, which set forth rules for sale of forest produce and specify royalty rates.

Several aspects of the act are noteworthy. Government has exclusive control over gazetted forest areas, where no activities may be undertaken except under licence. The new forest policy (see below) attempts to tackle this issue; until now, however, it has meant that other land uses cannot be integrated into the gazetted forest estate. By contrast, except in unalienated Government land, the Forest Department (FD) has no management and conservation powers outside the gazetted forest reserves. However, the appropriate management of gazetted forests must include the management of surrounding areas. Also, considerable areas of forests and woodlands are on private land and on trust land managed by the county councils. The FD must rely on the Ministry of Agriculture, the Provincial

Administration and the country councils (through the Local Government Act) to prevent destruction of vegetation in these areas.

The act provides for the de-gazettement of forest areas at the discretion of the Minister in charge of this department. The only requirement to effect this is 28 days notice in the Kenya Gazette. Large areas of the forest estate have been de-gazetted in recent years under this provision, for conversion to agriculture or settlement. These excisions have not been carried out according to any overall strategy and have often appeared arbitrary. There is evidence that many areas of particular importance for biodiversity conservation have been lost (IUCN 1996). The fact that there is no local input into forest management under the present act undoubtedly serves to increase political pressure for excisions. Another major weakness of the Forests Act is that the body set up to implement it, the Forest Department, is not a state corporation (like KWS) but simply a department within a particular ministry. This means that any revenue generated through forests returns to the Treasury. There is no provision for setting aside any income towards the conservation of particular forests. The practical consequence is that the Forest Department has been perenially starved of funds for its own operations. As a result, control of forest use is generally ineffective and many sites have become severely degraded.

The act allows for Nature Reserves to be designated within forests to conserve important fauna and flora. Disturbance to the forest is supposed to be limited within a nature reserve. A number of such reserves has been designated in various forests, but as a biodiversity conservation tool they have several draw-backs. First, they usually cover only a small part of the overall forest area. Second, they are rarely designated on the basis of any detailed knowledge of the distribution of animals and plants of concern, and so may leave out important micro-habitats or populations of particular species altogether. Third, designation has in practice provided very little additional protection. Although licensed logging may not take place, nature reserves are as subject as any other part of a forest to encroachment, tree poaching and other disturbances.

Forest Policy

Kenya's first forest policy was drawn up in 1957, and restated by the Government of Kenya in 1968 (GoK 1968). This policy is now outdated in several ways: it does not take into account the increased human pressure on forests, nor their critical importance for biodiversity conservation. A new policy has been drafted and presently awaits Cabinet approval.

The old forest policy outlined the reservation of forests for soil and water conservation, and for forest products, particularly timber. Protection of forests against fires and grazing were its major objectives. It also encouraged the development of the forest industry, and mentioned the promotion of recreation, conservation of flora and fauna, research and education within forests. The implementation of the 1968 forest policy was successful in so far that most forests still exist and fulfil their role in protecting water catchments. However, the policy failed to prevent forest loss through de-gazettement and illegal excisions, degradation through over-exploitation, and illegal encroachment. In practice, the Forest Department has been consistently under-funded by Government, not reflecting the substantial revenue generated for the Treasury by forestry activities. Forest research has also been neglected, and few forestry staff have been trained in modern techniques such as community-based management and biodiversity conservation.

The new forest policy is broader than the old one. It maintains the important functions of environmental protection and sustainable exploitation of forest products. The policy recognises that ecotourism is an increasingly important forestry activity. This, it states, should be promoted for maximum benefit to the local people and raising of revenue for forest conservation while at the same time minimising environmental damage. Most important, the policy states that *'all gazetted indigenous forests, woodlands, bushlands and mangroves should remain reserved'*. The policy has the following major objectives:

1. Increase the forest and tree cover of the country to ensure an increasing supply of forest products and services for meeting the basic needs of present and future generations and for enhancing the role of forestry in socio-economic development.

2. Conserve the remaining natural habitats and the wildlife therein, rehabilitate them and conserve their biodiversity.

3. Contribute to sustainable agriculture by conserving the soil and water resources by tree planting

and appropriate forest management.

4. Support the Government policy of alleviating poverty and promoting rural development, by income based on forest and tree resources, by providing employment, and promoting equity and participation by local communities.

5. Fulfil the agreed national obligations under international environmental and other forest-related conventions.

6. Manage the forest resource assigned for productive use efficiently for the maximum sustainable benefit, taking into account all direct and indirect economic and environmental impacts; also review the ways in which forests and trees are valued, in order to facilitate management decisions.

7. Recognise and maximise the benefits of a viable and efficient forest industry for the national economy and development.

3.5.6 Wetlands management

No coherent policy exists for wetland management in Kenya, but steps are being taken to formulate one. In the absence of any clear controlling and co-ordinating authority, wetlands face threats from a number of different directions. These include poor agricultural practices and deforestation in catchment areas, leading to soil erosion and the silting of rivers and lakes. Direct drainage for cultivation (encouraged by the Ministry of Agriculture) has destroyed many small wetlands and severely damaged others, such as Yala Swamp (IBA 41) - often with little economic benefit.

Water is generally a scarce resource in Kenya and there are many competing demands. Increasing use for irrigation and industry, often not well regulated, has changed the water balance of many wetlands. Pollution and eutrophication are also intensifying at many sites, such as Lake Nakuru (IBA 49) and Lake Victoria's Winam Gulf (IBAs 37, 38, 39 and 60). The infestation of Lake Victoria by Water Hyacinth has had severe knock-on effects on the papyrus swamps by disrupting the fishing economy and increasing people's dependence on cultivation.

Kenya is a signatory to the Ramsar Convention on Wetlands of International Importance (see section 3.5.8 below). This Convention gives contracting parties general responsibilities for wetland conservation, and specific responsibilities for the wise use of listed sites. Two Kenyan sites are listed (Lake Nakuru, IBA 49, and Lake Naivasha, IBA 48), and many more could potentially be added. The majority of Kenya's wetland IBAs are potential Ramsar sites, meeting the Convention's criteria for listing.

As elsewhere, legislation to tackle these problems exists; the difficulty lies more in institutional weaknesses and lack of co-ordination. The Water Act (Cap. 372) lays down the basic legal framework for the management of water resources. These are all vested in the state, except where they lie wholly within a land-owner's property. Administratively, the country is divided into six catchment areas under catchment boards that advise on allocation of water supplies. Via additional acts, the main catchments have also been given specific 'development authorities' (Lake Basin, Kerio Valley, Tana and Athi Rivers, Coast, Ewaso Ng'iro North and Ewaso Ng'iro South). These have also become important players in this sector. Also involved are the National Irrigation Board, the Water Conservation and Pipeline Corporation, and a number of local authorities. This proliferation of institutions leads to almost inevitable conflict and overlap of effort.

The Water Act lays down provisions for protecting catchments from deforestation. The Minister may designate protected catchment areas, within which activities may be regulated as necessary. However, the Water Act does not provide for control of other land uses that may degrade the catchment through soil erosion. The Agriculture Act, on the other hand, does provide a framework for dealing with these problems, although these provisions seem rarely to be implemented.

Control of water pollution is covered, in a general sense, by the Water Act. However, the legislation is deficient, since it does not lay down water quality and discharge standards or provide powers for these to be defined. It also does not provide for water quality monitoring. The Merchant Shipping Act covers oil discharges from ships, but does not deal with other aspects of marine pollution. The Public Health and Pest Control Products Acts also touch directly or indirectly on water pollution, but there is little institutional capacity to implement their provisions.

A substantial step forward in cross-sectoral wetlands management was the setting up of a National Wetlands Standing Committee (a sub-committee of the Inter-Ministerial Committee on Environment) in 1994. With co-ordination from the National Environment Secretariat Wetlands Programme, this committee is preparing a draft wetlands policy.

3.5.7 The Protected Areas system

Protected areas include national parks, national reserves, local sanctuaries, private sanctuaries, forest reserves, County Council forests and national monuments.

Kenya has more than 50 national parks, reserves and sanctuaries, both terrestrial and marine. These cover some 4.4 million ha, roughly 7.5% of the country's land area. A large chunk of this area (over 2 million ha) is accounted for by the two biggest national parks, Tsavo East (IBA 24) and Tsavo West (IBA 25).

Kenya's national parks and national reserves are mainly in arid and semi-arid parts of the country, dominated by woodland, bushland and grassland habitats. Only about 6.2% of Kenya's approximately 1.24 million ha of indigenous forest (including mangroves) is protected in national parks and reserves (IUCN 1996). By contrast, some 85% of indigenous forest is included in gazetted forest reserves, on both Government and Trust land. An additional 7% or so is ungazetted forest on trust land, some of it managed by the Forest Department on behalf of County Councils. Some indigenous forest is still found on private land, but this is likely to be a very small area.

Some additional sites have been listed or proposed for listing under international conventions, such as the Ramsar and World Heritage Conventions (see section 3.5.8 below). Kenya also encourages private wildlife sanctuaries. The exact number of these is unclear; the IUCN protected areas database lists over 50, some of which seem likely to have no formal conservation management, while only nine sites are mentioned by NBU (1992).

National Parks

Nairobi National Park (IBA 36) was the first national park in Kenya, established in 1946. Today there are 22 terrestrial national parks and four marine national parks. The terrestrial parks cover an area of some 2.9 million ha, approximately 4.9% of Kenya's land area. National Parks vary in size from just 192 ha (Saiwa Swamp) to more than 1,170,000 ha (Tsavo East National Park, IBA 24). All are administered by the Kenya Wildlife Service.

National Reserves

There are a total of 28 national reserves (including marine sites) administered by the local authorities. Two additional reserves – Marsabit and Shimba Hills (IBA 20) – are administered by the Kenya Wildlife Service. Terrestrial national reserves occupy some 1.5 million ha, about 2.6% of Kenya's total land area.

Forest Reserves

About 2.6% of the Kenya's total land area is forest cover, representing approximately 15% of the high potential agricultural land. Around 1.6 million hectares of land are gazetted as forest reserves (Wass 1995), a figure that includes 1.06 million hectares of indigenous closed canopy forests and 0.16 million hectares of exotic plantations. Another 0.18 million ha of indigenous forest cover is found outside gazetted areas. Wass (1995) lists some 255 separate forest reserves in Kenya, of which 32 are not yet gazetted. They range in size from less than 1 ha to almost 200,000 ha (in the case of Mt Kenya).

All forest reserves are government land, gazetted under the Forest Act under which certain consumptive uses are permitted under licence. Forest reserves often contain other habitats than indigenous forest. Many are at least partly made up of plantations of exotic trees, and within their boundaries they may also include large areas of primary or secondary grassland and scrub. Around the perimeter of at least 14 reserves lie Nyayo Tea Zones, totalling about 11,000 ha. These comprise land assigned to the Nyayo Tea Zone Development Corporation, which was created through a presidential order in 1986 and an act of parliament in 1988. These areas were cleared and (in some cases) planted with tea to create a buffer zone around the forests. They remain part of the forest reserves since they were not de-gazetted.

Some forest reserves contain areas gazetted as nature reserves, within which no consumptive use is officially permitted. Eleven nature reserves are listed, with a total area of some 53,000 ha.

Though over 90% of Kenya's forest cover has been gazetted within some type of protected area, the protection is in most cases inadequate. The average annual depletion of forest cover appears to be about

1%, with the highest rates occurring in forests in or near high potential lands. Under good management forest resources are potentially renewable, but this is not the case in Kenya at present.

National Monuments

These are areas of cultural and religious importance. A number of the 'sacred' kaya forests at the Kenya coast are already gazetted as national monuments and more have been proposed for gazettement. Though fairly small these forests are important for biodiversity conservation as well as their cultural values. National Monuments are administered by the National Museums of Kenya.

3.5.8 International conventions and agreements

Kenya is a party to the African Convention on the Conservation of Nature and Natural Resources (signed in Algiers on 16 September 1968). It has also acceded to three important international conventions that pertain to protected areas. These are the Convention on Wetlands of International Importance especially as Waterfowl Habitat (signed in Ramsar, Iran, on 2 February 1971), the Convention on the Protection of the World Cultural and Natural Heritage (signed in Paris on 23 November, 1972) and the Convention on Biological Diversity (signed in Rio de Janiero on 5 June 1992). Kenya has also acceded to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, signed in Washington on 3 March 1973), but not to the Convention on the Conservation of Migratory Species of Wild Animals (signed in Bonn on 23 June 1979). Neither has Kenya acceded to the Convention for the Protection, Management and Development of the Marine Environment and the Coastal Areas of the East African Region (the Nairobi Convention, adopted on 21 June 1985).

The Algiers Convention

The African Convention on the Conservation of Nature and Natural Resources was acceded to by Kenya on 16 June 1969. Contracting parties are obliged to ensure the conservation, rational use and development of soil, water, floral and faunal resources. Kenya's obligations under the convention are essentially provided for under the Forests and the Wildlife (Conservation and Management) Acts. Deficiencies remain in the integration of ecological factors into development planning and the management of natural resources outside protected areas (NBU 1992).

The Nairobi Convention

This is a regional framework convention adopted under the United Nations Environmental Programme's Regional Seas Programme. It establishes general principles for the conservation of the marine and coastal environment in eastern Africa. Two protocols, adopted at the same time, deal with the conservation of biodiversity and the establishment of protected areas. The convention has not yet entered into force, and Kenya (after participating in the negotiation of the convention and its two protocols) declined to sign.

Ramsar Convention

The Ramsar Convention aims to ensure the 'wise use' of wetlands for the benefit of people, in a way that is compatible with maintaining the natural properties of the ecosystem. The convention also establishes certain guidelines for the formulation and implementation of wetland policies. These include the drawing up of national inventories of wetlands, determining priorities for each site, undertaking impact studies for projects which may affect wetlands, regulating the use of wild fauna and flora so as to avoid over-exploitation, and drafting legislation that encourages wetland conservation. Contracting parties must designate at least one site for inclusion in the list of wetlands of international importance, on the basis of the site's international significance in terms of ecology, botany, zoology, limnology or hydrology. Criteria for assessing importance have been formulated by the Conference of the Parties, and include specific thresholds for waterbird populations.

Kenya became a contracting party on 5 June 1990 through designation of Lake Nakuru National Park as a Ramsar site. Lake Naivasha was designated as a Ramsar site in 1996. Many more sites would qualify for designation, among them the wetland IBAs included in this directory.

The Convention on Biological Diversity

This convention came into force on 29 December 1993. It identifies the responsibility of states to conserve their biological diversity and use their biological resources sustainably. It requires that the contracting parties anticipate, prevent and attack the causes of reduction or loss of biological diversity. The convention notes that 'the fundamental requirement for the conservation of biological diversity is the *in situ* conservation of ecosystems and natural habitats and the maintenance and

recovery of viable populations of species in their natural surroundings.' To achieve this, contracting parties are required as far as possible to:

1. Establish a system of protected areas or areas where special measures need to be taken to conserve biological diversity.

2. Develop, where necessary, guidelines for the selection, establishment and management of protected areas or areas where special measures need to be taken to conserve biological diversity.

3. Regulate or manage biological diversity whether within or outside protected areas, with a view to ensuring its conservation and sustainable use.

4. Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.

5. Promote environmentally sound and sustainable development in areas adjacent to protected areas with a view to furthering protection of these areas.

6. Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, *inter alia*, through the development and implementation of plans or other management strategies.

7. Prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species.

The convention does not provide guidelines to parties for setting priorities among sites that are important for biological diversity. Instead it gives a broad list that indicates the components of biological diversity that are important for its conservation and sustainable use. The IBA process contributes to setting priorities for conservation action, thus helping to fulfil national obligations under this convention.

The World Heritage Convention

This convention is for the conservation of areas that are of outstanding global cultural or natural value. The following are considered as natural heritage: (a) natural features consisting of physical and biological formations or groups of such formations, which are of outstanding universal value from the aesthetic or scientific point of view; (b) geological and physiographical formations and precisely delineated areas which constitute the habitat of threatened species of animals and plants of universal value from the point of view of science or conservation; (c) natural sites or precisely delineated areas of outstanding universal value from the point of view of science, conservation or natural beauty. In addition the convention requires that each party recognises its duty to ensure the identification, protection, conservation, presentation and transmission to future generations of the natural heritage situated within its territory. The primary concern of the convention is the protection of habitats and ecosystems rather than species. To achieve its objectives, contracting states must try to integrate heritage protection into comprehensive planning programmes, to set up services for heritage protection, to develop scientific research, and to take legal, scientific, technical, administrative and financial measures necessary for heritage identification, protection, conservation and presentation. Since the sites constitute a world heritage of value to the international community, states are enjoined to co-operate in their conservation and preservation.

By the end of 1992 there were 129 parties to the convention, making it the most widely applicable area-based conservation treaty in the world. In Kenya only Sibiloi National Park has been proposed for inclusion in the list of World Heritage sites, even though many more sites would qualify.

UNESCO's Man and Biosphere programme

This is a programme of the United Nations Educational, Scientific and Cultural Organisation (UNESCO) that was launched in 1970. Biosphere reserves are areas of terrestrial and coastal ecosystems which are internationally recognised within the framework of UNESCO's Man and Biosphere Programme. Biosphere reserves were initiated with the aim of developing rational use and conservation of the resources within the biosphere. They form a world-wide network representing different ecosystems and are selected on the basis of four categories. These are (a) representative examples of natural biomes; (b) unique communities or areas with unusual natural features of exceptional interest, such as a population of a globally rare species; (b) examples of harmonious landscapes resulting from traditional patterns of land use; (d) examples of modified or degraded ecosystems capable of being restored to more natural conditions. Conservation, scientific research, monitoring, education and training are essential purposes of

biosphere reserves, which must also be integrated into their social, economic and cultural environment. As a result they should as much as possible involve the local communities in their conservation and management. Each Biosphere Reserve is intended to fulfil three basic functions which are complementary and mutually reinforcing. These are: (1) conservation of landscapes, ecosystems, species and genetic variation; (2) promotion at a local level of economic development which is culturally, socially and ecologically sustainable; and (3) a logistic function to provide support for research, monitoring, education and information exchange.

Designations of biosphere reserves are made on a voluntary basis and there is no legal obligation for an area to remain protected. However, proposed sites must be approved by the Man and Biosphere co-ordination council, which has the authority to reject unsuitable sites. Biosphere reserves include a core area, a buffer zone and a transition area. Most of them encompass a protected area such as a national park. The core areas of Biosphere Reserves are mostly protected land owned by the government, while the buffer zone and transition zone are mostly under community or private ownership.

By 1996 there were over 325 reserves within the network in 83 countries, covering an area of more than 218 million hectares. In Kenya there are five biosphere reserves with an area of over 1.3 million hectares in total. The first sites to be designated were Mt Kenya (IBA 5) and Mt Kulal in 1978. These were followed by the Malindi-Watamu Biosphere Reserve (IBA 16) in 1979, Kiunga Marine National Reserve (IBA 15) in 1980 and Amboseli Biosphere Reserve (IBA 42) in 1991.

The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES)

This convention came about through international concern about the increasing levels of trade in wild flora and fauna, which posed a danger to some threatened species. CITES was adopted on 6 March 1973 and entered into force on 1 July 1975. Trade in particular species, which are listed on the CITES appendices, is banned or regulated depending on the level of threat. 'Look-alike' species that are not themselves threatened, but may be confused with endangered ones, are also listed.

Kenya ratified the convention on 13 March 1979, but no domestic legislation was enacted to implement it. Nonetheless, Kenya's existing regulations on trade in wildlife and its products meet and exceed the requirements of CITES. Thus the existing Wildlife (Conservation and Management) Act does, in practice, put the Convention's obligations into effect, but not entirely in accord with CITES requirements. For instance, the Convention requires that contracting parties designate separate management and scientific authorities, but in Kenya the Kenya Wildlife Service fulfils both these functions.

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

This convention came into force in 1983. Its fundamental objective is to protect migratory species that cross one or more borders, where conservation deficiencies in one state will affect the measures undertaken by other states. Under the convention, migratory species are defined as those that periodically and predictably cross one or more jurisdictional boundaries.

Migratory species that the convention seeks to protect are listed in its Appendix I. The convention also facilitates international Agreements between states for the protection and management of migratory species that have an unfavourable conservation status and would benefit from international co-operation. Agreements are the main tools for implementing the Bonn Convention, and are more specific and focused than the convention itself. States need not be party to the convention itself to sign a particular Agreement.

Kenya has not yet acceded to this convention[1]. This is despite the fact that the Bonn Convention's Appendices cover a number of Kenyan bird species and two Kenyan mammals (African Elephant and Grevy's Zebra). Kenya is also within the geographical area (i.e. a range state) for the African-Eurasian Migratory Waterbird Agreement, produced under the convention. This Agreement has been open for signing since 15 August 1996 and is expected to enter into force in the near future. It commits signatories to take co-ordinated measures to maintain migratory waterbird species in a favourable conservation status, or to restore them to such a status.

[1]*Note: Kenya ratified the Bonn Convention in 1999, as this directory was going to press.*

3.6 Priorities for action

As resources are scarce, it is unlikely that immediate, comprehensive conservation action can be taken at all of Kenya's 60 IBAs. This means that it is important to set priorities for action among sites. This section presents a priority-setting methodology and the results of applying it to IBAs in Kenya. The methods were refined and applied during a priority-setting workshop held at Naivasha, Kenya, on 7–8 December 1998. Only an outline account is given here; more details will be published elsewhere (*Bennun & Matiku, in preparation*).

When examining the results of this analysis (Table 8) it is important to remember that **all** IBAs are priority sites for biodiversity conservation. This analysis attempts to decide, in an objective and defensible way, where efforts and resources should initially be targeted.

3.6.1 The approach

Priorities have been set by combining a measure of **threat** with a measure of **biological importance**. As these are priorities for action, the urgency and scale of action are primarily determined by threat. Within threat classes, priority depends on biological importance.

3.6.2 Assessing threat

As in the discussion above ('conservation issues'), six main classes of threats are recognised:

- A Habitat loss caused through government action (e.g. forest de-gazettement, drainage projects)
- B Habitat loss caused through conversion of private land or encroachment
- C Habitat degradation and/or fragmentation through unsustainable use
- D Pollution
- E Alien species
- I Hunting or poaching.

Threats were assessed by the workshop participants for each site. Both immediate threats and likely future threats (within the next three years) were considered for each threat class. In each case, the threat was assigned to one of four levels: 1 = slight; 2 = moderate; 3 = severe; 4 = critical, based on the **actual impact** a particular threat would have on the site and its biodiversity. (Thus a threat that was relatively severe at a particular site compared to other sites, but would have little actual impact, could be rated slight.)

An overall threat score for the site was given based on the highest score in any **single** class of threat. These scores were assigned as follows:

1 Site faces few immediate threats; threat level will not increase greatly if no action taken within next three years [now 1, future 2]

2 Site faces moderate immediate threat, **and/or** likelihood of substantially increased threat level if action not taken within next three years [now 2, future 3]

3 Site faces substantial immediate threat, **and/or** likelihood of critical threat levels if action not taken within next three years [now 3, future 4]

4 Site is critically threatened and immediate action essential [now 4]

The threats assigned for each site, and the overall scores, are shown in Table 7. It is clear from the table that threat classes A, B and C (habitat loss, fragmentation and degradation) are by far the most important and urgent threats facing IBAs in Kenya.

3.6.3 Biological importance

Here, biological importance has two components: **importance for birds**, and **importance for other biodiversity**. Importance for birds is the more straightforward to assess, as the information is more complete. However, both measures were given equal weight in the final ranking.

Sites were scored on a set of parameters, then these scores mapped onto a simple four-level ranking. Scoring is used as a way of making sense of detailed information that might otherwise be confusing. Because the final result is a simple hierarchy, the scores themselves, and exactly how they are derived, are of less importance than in some schemes.

The size of a site and its global uniqueness are not explicitly considered. These aspects are already bound up into the IBA categories themselves, and

into the scoring methods for biological importance described below. The issue of complementarity (e.g. Howard *et al.* 1998) was also ignored; thus a particular site's priority was not affected by the kinds of sites already listed. Again, complementarity is implicit at an earlier stage in the process, in the IBA requirements to cover the full set of restricted-range and biome-restricted species in a country.

Importance for birds

There are four categories in which IBAs may be listed, and some IBAs qualify for more than one category. All else being equal, the more categories that an IBA qualifies for, the more important it can be considered. The categories involve different kinds of criteria and no category has logical or conservation priority over any other. They are in effect different currencies that need to be combined.

The approach taken here was to score sites within all four categories, map the scores on to a simple ranking, and then combine these ranks for all the categories to give a final level of importance. Note that every site was scored for every category, whether or not it was listed under that category in the directory.

A1. Threatened species
Rationale: Sites with more threatened species, and/or more severely threatened species, are more important.

Each threatened species was assigned points as follows:

Critically threatened	3
Endangered	2
Vulnerable	1
Near-threatened	0.5
Regionally threatened	0.1

A score of 1–4 for the site was assigned according to the total points. Appendix 5 shows the data used to calculate these scores for Kenya's IBAs.

Total points	Assigned score
0 – 0.9	0
1.0 – 1.9	1
2.0 – 2.9	2
3.0 – 3.9	3
>3.9	4

The notes on applying the IBA criteria distinguish between different levels of threat. This scoring system attempts to weight the different levels. It also introduces a slightly broader view of importance for threatened birds by including a modest weighting for regionally threatened species.

A2. Restricted-range species
Rationale: Sites with more restricted-range species are more important.

The number of restricted-range species was totalled and a score assigned according to the following scale:

Total	Assigned score
0	0
1	1
2	2
3	3
>3	4

This approach considers the absolute number of restricted-range birds, rather than the proportion of the total complement within the EBA. This recognises that not all EBAs are of equal importance as centres of endemism.

A3. Biome-restricted species
Rationale: Sites that more completely cover a given biome are more important.

The number of species in each biome was listed. The percentage that this constitutes of the **Kenyan** total of species in that biome was then calculated. The highest percentage in any one biome determined the assigned score.

Highest percentage of biome species	Assigned score
0–16	0
17–33	1
34 –50	2
51–67	3
> 67	4

This approach has the following features:

- the **percentage** of each biome total is considered; i.e. a 'small' biome like the Lake Victoria Basin biome is considered as important as a 'large' one like the Somali-Masai biome. Biome-restricted assemblages are among the IBA categories in order to ensure that no appropriate bird species is left out. This suggests that completeness of coverage is more significant than absolute numbers (i.e. it is not the fact that a site contains

many species that is important, but that this number constitutes a significant proportion of the overall set).

- For similar reasons, these percentages are not additive across biomes. It would make little sense to have a site that had a few biome species in several biomes scoring higher than one with almost all the species in one biome.
- The percentage calculated is out of the number of biome species **nationally**, not across the biome as a whole. This corresponds with the way that sites in category A3 are selected in the first place, and puts stress on the completeness of coverage across the whole geographical spread of a biome.

A4. Congregations

Rationale: Sites that qualify for more species, or that more substantially exceed the threshold values for any one species, are more important.

Two different approaches were used here, and then combined to create a single score.

(a) For each species for which the site is listed (or for all species combined if listed under category A(iii)), the number of that species recorded was divided by the threshold value. The highest multiple of the threshold was used to assign a score, as follows:

Multiple	Assigned score
0 – 0.9	0
1.0 – 2.9	1
3.0 – 6.9	2
7.0 – 14.9	3
>14.9	4

(b) The number of individual species for which a site qualifies under category A(i) or A(ii) was tallied, and a score assigned as follows:

Number	Assigned score
0	0
1	1
2	2
3	3
>3	4

The mean score of (a) and (b) gave the overall score for this category.

Overall bird importance

The scores for all four categories were summed and an overall ranking given as follows:

Overall summed score	Rank
1.0 – 2.9	1
3.0 – 4.9	2
5.0 – 6.9	3
> 6.9	4

Appendix 7 shows the data and scores in each category for Kenya's IBAs.

Importance for other biodiversity

A rank from 1–4 was assigned to each site as follows, based on overall diversity and/or the numbers of (viable populations of) globally threatened or (near)-endemic plants, butterflies, fish, reptiles, amphibians or mammals present. (Endemic or near-endemic species were considered those confined to this site and at most two other known sites.)

Numbers of threatened/endemic species	Rank
Low – 0	1
Moderate – 1–2	2
High – 3–5 **or** <3 and very diverse	3
Very high – > 5 **or** 3–5 and very diverse	4

Enough information exists on all Kenya's IBAs to attempt this ranking, though the criteria are necessarily more vague than for the bird importance score.

Overall biological importance

This is a score from 2–8 produced by adding the scores for overall bird importance and importance for other biodiversity.

3.6.4 Priority sites

Table 8 shows the results of the priority-setting exercise, with sites ranked within threat classes according to overall biological importance.

The number of IBAs with particular biological importance scores within each threat class is shown by a filled circle in the following matrix.

	Biological importance						
Threat	8	7	6	5	4	3	2
4	●●● ●●●	●●	●●	●●	●	●●	
3	●● ●●	●●● ●●●	●●	●●	●		
2	●	●		●●● ●●	●	●●	●●
1	●	●●	●●●	●●●		●●	●●

Table 7
Classes and severity of conservation threats to Kenya's IBAs

Site code	Site names	Threat category A P	A F	B P	B F	C P	C F	D P	D F	E P	E F	F P	F F	Overall score
1	Aberdare Mountains	1	1	2	2	3	3	1	1	1	1	1	2	3
2	Kianyaga Valleys	1	1	4	4	4	4	1	1	1	1	3	3	4
3	Kikuyu Escarpment Forest	3	4	2	3	3	3	1	1	1	1	1	1	3
4	Kinangop Grasslands	1	1	4	4	4	4	1	1	2	3	1	1	4
5	Mt Kenya	3	3	3	4	4	4	1	2	1	1	2	2	4
6	Mukurweini Valleys	1	1	4	4	4	4	1	1	1	1	2	2	4
7	Arabuko-Sokoke Forest	4	4	2	3	3	3	1	1	1	1	2	2	4
8	Dakatcha Woodland	1	1	3	3	3	3	1	1	1	1	2	2	3
9	Diani Forest	1	1	3	4	4	4	2	2	1	1	1	1	4
10	Dzombo Hill Forest	1	1	1	1	2	2	1	1	1	1	1	1	2
11	Gede Ruins National Monument	1	1	1	1	1	1	1	1	1	1	1	1	1
12	Kaya Gandini	1	1	1	1	1	1	1	1	1	1	1	1	1
13	Kaya Waa	4	4	1	1	3	3	1	1	1	1	1	1	4
14	Kisite Island	1	1	1	1	1	1	1	1	1	1	1	1	1
15	Kiunga Marine National Reserve	1	1	1	1	1	1	1	1	1	1	2	2	2
16	Mida Creek, Whale Island & Malindi/Watamu Coast	1	1	1	1	2	2	1	1	1	1	2	2	2
17	Marenji Forest	1	1	1	1	1	3	4	1	1	1	1	1	4
18	Mrima Hill Forest	1	1	2	3	3	3	1	1	1	1	1	1	3
19	Sabaki River Mouth	1	1	1	1	2	2	2	2	1	1	1	1	2
20	Shimba Hills	1	1	1	1	2	3	1	1	1	1	2	2	2
21	Taita Hills Forests	1	1	2	2	4	4	1	1	3	4	1	1	4
22	Tana River Delta	3	4	2	2	2	2	1	2	1	1	1	1	3
23	Tana River Forests	1	1	4	4	4	4	1	1	1	1	1	1	4
24	Tsavo East National Park	1	1	1	1	1	1	1	1	1	1	1	1	1
25	Tsavo West National Park	1	1	1	1	1	1	1	1	1	1	1	1	1
26	Chyulu Hills Forests	1	1	1	2	1	2	3	1	1	1	1	1	2
27	Dida Galgalu Desert	1	1	1	1	1	1	1	1	1	1	1	1	1
28	Lake Turkana	1	1	1	1	1	1	1	2	1	1	2	2	2
29	Machakos Valleys	1	1	2	3	2	3	1	1	1	1	1	1	2
30	Masinga Reservoir	1	1	1	1	1	1	1	2	1	1	2	3	2
31	Meru National Park	1	1	1	1	1	1	1	1	1	1	1	1	1
32	Mwea National Reserve	1	1	1	1	1	1	2	2	1	1	1	1	2
33	Samburu/Buffalo Springs National Reserves	1	1	1	1	1	1	1	1	1	1	1	1	1
34	Shaba National Reserve	1	1	1	1	1	1	1	1	1	1	1	1	1
35	Dandora Ponds	1	1	1	1	1	1	1	1	1	1	1	1	1
36	Nairobi National Park	4	4	1	1	1	1	2	3	1	1	1	1	4
37	Dunga Swamp	1	1	2	3	3	3	2	3	2	2	2	2	3

Site code	Site names	Threat category A P	A F	B P	B F	C P	C F	D P	D F	E P	E F	F P	F F	Overall score
38	Kogatā Swamp	1	1	3	3	2	3	1	1	2	2	2	2	3
39	Kusa Swamp	1	1	3	3	2	3	1	1	2	2	2	2	3
40	Ruma National Park	1	1	1	1	1	1	1	1	1	2	2	2	2
41	Nyando Swamp	3	4	2	2	2	2	2	3	2	3	2	2	3
42	Amboseli National Park	1	1	1	1	2	2	1	1	1	1	1	1	2
43	Chyulu Hills	2	3	3	4	2	3	1	1	1	1	1	1	3
44	Lake Baringo	1	1	1	1	2	3	1	1	1	1	1	1	2
45	Lake Bogoria National Reserve	1	1	1	1	1	2	1	1	1	1	1	1	1
46	Lake Elmenteita	1	1	2	3	2	3	1	2	1	1	1	1	2
47	Lake Magadi	1	1	1	1	1	1	1	1	1	1	1	1	1
48	Lake Naivasha	2	1	3	4	2	4	3	4	4	4	3	3	4
49	Lake Nakuru National Park	3	4	1	1	3	3	2	3	1	1	1	1	3
50	Masai Mara	2	2	3	4	2	3	2	2	1	1	1	1	3
51	Mau Forest Complex	3	4	3	3	3	3	1	1	1	1	2	2	3
52	Mau Narok / Mojo Grasslands	1	1	4	4	4	4	1	1	2	3	1	1	4
53	North Nandi Forest	3	4	3	3	3	1	1	1	1	1	1	1	3
54	Ol Donyo Sabache	1	1	1	1	3	4	1	1	1	1	1	1	3
55	South Nandi Forest	3	4	3	3	4	4	1	2	1	1	1	1	4
56	South Nguruman	1	1	1	2	1	1	1	1	1	1	1	1	1
57	Ilbisil Grasslands	3	4	4	4	2	2	1	1	1	1	1	1	4
58	Kakamega Forest	3	1	4	4	4	4	1	1	1	1	3	3	4
59	Mt Elgon	2	3	2	3	3	4	1	1	1	1	3	3	3
60	Sio Port Swamp	1	1	3	3	2	3	1	1	2	2	3	3	3

A: Habitat loss through government action
B: Habitat loss through other conversion or encroachment
C: Habitat degradation or fragmentation through unsustainable use
D: Pollution
E: Alien species
F: Hunting/poaching
P: At present
F: Future (within the next three years)

Levels of threat (see text):

1: Slight
2: Moderate
3: Severe
4: Critical

Table 8

Biological importance and threat scores for Kenya's IBAs

Sites are ranked by biological importance score (minimum 2, maximum 8) within threat classes (most threatened 4, least threatened 1)

(tied sites are listed in order of site number)

Site code	Site names	Birds	Biodiv.	Overall	Threat	Priority for action	Site code
5	Mt Kenya	4	4	8	4	CRITICAL	5
7	Arabuko-Sokoke Forest	4	4	8	4	CRITICAL	7
21	Taita Hills Forests	4	4	8	4	CRITICAL	21
23	Tana River Forests	4	4	8	4	CRITICAL	23
36	Nairobi National Park	4	4	8	4	CRITICAL	36
58	Kakamega Forest	4	4	8	4	CRITICAL	58
52	Mau Narok/Molo Grasslands	4	3	7	4	CRITICAL	52
55	South Nandi Forest	3	4	7	4	CRITICAL	55
4	Kinangop Grasslands	3	3	6	4	CRITICAL	4
9	Diani Forest	3	3	6	4	CRITICAL	9
13	Kaya Waa	2	3	5	4	CRITICAL	13
57	Busia Grasslands	2	3	5	4	CRITICAL	57
48	Lake Naivasha	2	2	4	4	CRITICAL	48
2	Kianyaga Valleys	2	1	3	4	CRITICAL	2
6	Mukurweini Valleys	2	1	3	4	CRITICAL	6
1	Aberdare Mountains	4	4	8	3	CRITICAL	1
22	Tana River Delta	4	4	8	3	CRITICAL	22
50	Masai Mara	4	4	8	3	CRITICAL	50
59	Mt Elgon	4	4	8	3	CRITICAL	59
3	Kikuyu Escarpment Forest	4	3	7	3	URGENT	3
8	Dakatcha Woodland	3	4	7	3	URGENT	8
17	Marenji Forest	3	4	7	3	URGENT	17
18	Mrima Hill Forest	3	4	7	3	URGENT	18
41	Yala Swamp	3	4	7	3	URGENT	41
43	Cherangani Hills	3	4	7	3	URGENT	43
49	Lake Nakuru National Park	4	3	7	3	URGENT	49
51	Mau Forest Complex	3	4	7	3	URGENT	51
53	North Nandi Forest	3	4	7	3	URGENT	53
37	Dunga Swamp	3	3	6	3	URGENT	37
54	Ol Donyo Sabache	2	4	6	3	URGENT	54
38	Koguta Swamp	2	3	5	3	URGENT	38
60	Sio Port Swamp	2	3	5	3	URGENT	60
39	Kusa Swamp	1	3	4	3	URGENT	39
20	Shimba Hills Forest	4	4	8	2	URGENT	20
10	Dzombo Hill Forest	3	4	7	2	URGENT	10
28	Lake Turkana	3	4	7	2	URGENT	28
46	Lake Elmenteita	4	2	6	2	URGENT	46
15	Kiunga Marine National Reserve	1	4	5	2	HIGH	15
16	Mida Creek, Whale Island and Malindi/Watamu Coast	2	3	5	2	HIGH	16
26	Chyulu Hills Forests	1	4	5	2	HIGH	26

Site code	Site names	Birds	Biodiv.	Overall	Threat	Priority for action	Site code
42	Amboseli National Park	2	3	5	2	HIGH	42
44	Lake Baringo	2	3	5	2	HIGH	44
19	Sabaki River Mouth	2	2	4	2	HIGH	19
29	Machakos Valleys	2	1	3	2	HIGH	29
32	Mwea National Reserve	1	2	3	2	HIGH	32
30	Masinga Reservoir	1	1	2	2	HIGH	30
40	Ruma National Park	1	1	2	2	HIGH	40
25	Tsavo West National Park	1	4	8	2	HIGH	25
12	Kaya Gandini	4	3	7	1	HIGH	12
56	South Ngurumen	4	3	7	1	HIGH	56
24	Tsavo East National Park	2	4	6	1	HIGH	24
33	Samburu/Buffalo Springs National Reserves	3	3	6	1	HIGH	33
34	Shaba National Reserve	3	3	6	1	HIGH	34
11	Gede Ruins National Monument	3	2	5	1	HIGH	11
31	Meru National Park	2	3	5	1	HIGH	31
45	Lake Bogoria National Reserve	4	1	5	1	HIGH	45
27	Dida Galgalu Desert	1	2	3	1	HIGH	27
47	Lake Magadi	1	2	3	1	HIGH	47
14	Kisite Island	1	1	2	1	HIGH	14
35	Dandora Ponds	1	1	2	1	HIGH	35

Key

Birds: Score for bird importance (1–4)

Biodiv.: Score for other biodiversity importance (1–4)

Overall: Score for overall biological importance (2–8)

Categorisation

Sites were given a three-level categorisation for conservation action priority as follows:

CRITICAL: sites for intensive and immediate action
URGENT: sites for ongoing action at a less intensive level
HIGH: sites for a set of lower-level actions

These categories are shown in Table 8 and also in the matrix above, where the dark shading shows sites in the 'critical' category, the lighter shading 'urgent' sites and the unshaded area 'high' priority sites.

Sites prioritised as 'critical'

(listed in alphabetical order)

Site no.	Site name
1	Aberdare Mountains
7	Arabuko–Sokoke Forest
57	Busia Grasslands
9	Diani Forest
58	Kakamega Forest
13	Kaya Waa
2	Kianyaga Valleys
4	Kinangop Grasslands
48	Lake Naivasha
50	Masai Mara
52	Mau Narok/Molo Grasslands
59	Mt Elgon
5	Mt Kenya
6	Mukurweini Valleys
36	Nairobi National Park
55	South Nandi Forest
21	Taita Hills Forests
22	Tana River Delta
23	Tana River Forests

Sites prioritised as 'urgent'

(listed in alphabetical order)

Site no.	Site name
43	Cherangani Hills
8	Dakatcha Woodland
37	Dunga Swamp
10	Dzombo Hill Forest
3	Kikuyu Escarpment Forest
38	Kogula Swamp
39	Kusa Swamp
46	Lake Elmenteita
49	Lake Nakuru National Park
28	Lake Turkana
17	Marenji Forest
51	Mau Forest Complex
18	Mrima Hill Forest
53	North Nandi Forest
54	Ol Donyo Sabache
20	Shimba Hills Forest
60	Sio Port Swamp
41	Yala Swamp

Sites prioritised as 'high'

(listed in alphabetical order)

Site no.	Site name
42	Amboseli National Park
26	Chyulu Hills Forests
35	Dandora Ponds
27	Dida Galgalu Desert
11	Gede Ruins National Monument
12	Kaya Gandini
14	Kisite Island
15	Kiunga Marine National Reserve
44	Lake Baringo
45	Lake Bogoria National Reserve
47	Lake Magadi
29	Machakos Valleys
30	Masinga Reservoir
31	Meru National Park

Black-capped Social Weaver

Sokoke Scops Owl

16	Mida Creek, Whale Island and the Malindi/Watamu Coast
32	Mwea National Reserve
40	Ruma National Park
19	Sabaki River Mouth
33	Samburu/Buffalo Springs National Reserves
34	Shaba National Reserve
56	South Nguruman
24	Tsavo East National Park
25	Tsavo West National Park

Conservation actions

Suggested classes of conservation actions for each of the priority categories, resulting from discussion at the priority-setting workshop, are given below.

Critical sites only	Urgent and critical sites	All sites
• Identify actual and potential stakeholders and collaborators for IBA conservation	• Develop and maintain site-support groups	• Monitoring
• Share benefits	• Socio-economic surveys	• Awareness raising for decision makers
• Provide alternative resources for the local people	• Education and awareness-raising	• Enforce conservation policies
• Conservation and development projects	• Local and national advocacy for IBA conservation	• Promote eco-tourism
• Integrated resource or ecosystem management		• Advocacy for protection status
• Develop and implement management or action plans		• Detailed surveys
• Fundraise to buy small unprotected sites		• Lobby for appropriate legislation on site conservation
• Habitat restoration and rehabilitation		• Gazettement and designation of unprotected IBAs

4 Site Accounts

4.1 Presentation of data

The main part of this directory consists of detailed descriptions for the 60 sites listed as Important Bird Areas in Kenya. Seven potential IBAs are described at the end of the main site accounts.

Site accounts are presented alphabetically by administrative province. Each site account contains the following sections:

Heading

This includes the site reference number, site name, location (co-ordinates and administrative province and district), area, altitude, conservation status, and the categories under which the site is listed.

Reference number: A number preceding the site name. Sites are numbered in the sequence in which they are presented, i.e. alphabetically within provinces.

Site name: A variety of spellings are in use for the names of some of the sites listed. We have chosen the spelling that appeared to be most appropriate. Usually this is either the gazetted name (for a protected area), or the name in most common use. IBA boundaries do not necessarily coincide with those of protected areas with similar names. Where the IBA name specifically mentions a protected area (e.g. 'Shaba National Reserve') then the IBA and the protected area are congruent.

Location: The latitude and longitude (to one minute of arc) of the approximate **central** point of the site are given. Large sites will obviously extend considerably to all sides of these co-ordinates. The province(s) and district(s) in which the site is located are also given. If only a very small portion of a site is in a particular province or district, this is indicated.

Area: The area of the IBA is given in hectares (100 ha = 1 km^2). Some sites have poorly defined boundaries and their area can only be approximated; such cases are indicated. For other sites, we have used a variety of sources to obtain areas. These include the World Conservation Monitoring Centre's database of protected areas, Wass (1995) (for forest reserves), Robertson & Luke (1993) (for coastal forests) and topographical maps (Survey of Kenya 1:250,000 and 1:50,000 series). These sources do not always agree with each other: such cases are discussed under the 'Site description' section.

Some IBAs contain a variety of habitats, not all of which may be used by the bird species for which the site is listed. For instance, some forest reserves include areas of plantation forest or grassland as well as indigenous forest. Where appropriate, the areas of key habitats within the IBA are indicated; further detail may be given under the 'Site description' section.

Altitude: The approximate altitudinal range of the site is given in metres above sea level, derived from similar sources to the site area.

Status: The conservation status of the site is briefly indicated. Types of site may include National Park, National Reserve, Forest Reserve, National Monument, Ramsar site, Biosphere Reserve, ungazetted Government land, trustland or private land. We were not able to clarify the status of some sites on public land (i.e. whether Government land or trustland). Different parts of a particular site may have different conservation status.

Categories: The IBA category or categories under which the site is listed are indicated (globally-threatened species, restricted-range species, biome-restricted assemblages or congregations). For biome-restricted assemblages, the biome in question is given.

Site description

The site description contains summary information on habitats, location and boundaries, history (where relevant), climate, vegetation (including dominant plant species where known) and ecology. Not all this information is available for all sites. This information is compiled from a wide variety of sources, referenced in the text and under 'Further reading'.

Birds

This section gives a brief explanation of the ornithological importance of the site. The text focuses on the reasons for listing the site as an IBA, but also gives other ornithological information

where appropriate. Details of the species for which the site is listed are given in a box within the text (which also shows species that are regionally threatened, from Bennun & Njoroge 1996), or (for biome-restricted species) in Appendix 3.

Information in the box includes the species' threat status (where appropriate) and status at the site (where known). Numbers counted (including maximum and mean counts where available) are given for congregatory species. Full references to the sources of the data are given. Square brackets around a species name indicate that the taxon is not considered a full species by OS-c (1996). Round brackets indicate that the species is suspected, but not known, to occur.

At some sites, particular globally-threatened, restricted-range or biome-restricted species occur but for various reasons have **not** been used to define the site as an IBA (see 'Selection of site', above). This might be because, for example, they occur only as wanderers (like the globally-threatened Shoebill in Amboseli National Park, IBA 42), or do not form a sufficient complement of species to merit listing in the relevant category (for instance, Green Tinkerbird as an East African coast biome species in Kaya Waa, IBA 13). Such species are mentioned in the site-account text, but not shown in the box.

Other wildlife

This section briefly outlines the importance of the site for other fauna and flora, specifically woody and non-woody plants, butterflies, fishes, amphibians, reptiles and mammals. The focus is on threatened and endemic species. A wide variety of sources have been consulted. Specific references are indicated here and under 'Further reading'; general references include Spawls (1978), Duff-MacKay (1980), Larsen (1991), Robertson & Luke (1993, for coastal forests), Beentje (1994) and Agnew & Agnew (1994).

Conservation issues

This section outlines the main threats currently facing the site and problems that seem likely to arise in future. Recommendations are made for specific conservation actions.

Further reading

This section gives references to articles that can be consulted if the reader requires more detailed information on the site. The further reading list is not intended to be comprehensive but will include the main sources of information used to compile the site account. As far as possible we have included references to general, popular articles as well as to more technical works. A full reference list for the entire directory appears at the end of the site accounts.

Appendices

Appendices 1–4 summarise the species relevant to each IBA category that are recorded from each site. Species that are regularly recorded are shown by a closed circle; species that are recorded from the site but are not normally present are shown by an open circle.

Maps

The maps are intended to give an overall idea of the site's location, size and shape. Major towns, roads and topographical features are shown, as well as key habitat types where appropriate. IBA boundaries are also shown (as dotted lines where the boundaries are not yet well defined). The maps are **not** intended to be definitive for demarcating the boundaries of any IBA. Maps for some IBAs are combined; this is indicated in the heading where appropriate.

Nomenclature

Only the English names of bird species are given in the text and Appendices 1–4. Scientific names of birds can be found in Indexes 1 and 2. Except where indicated, nomenclature follows OS-c (1996) and Zimmerman *et al.* (1996).

For other fauna and flora, scientific names are given in the text, together with the English name if appropriate. Nomenclature follows these standard texts:

Amphibians: Duff-MacKay (1980)
Butterflies: Larsen (1991)
Herbs: Agnew & Agnew (1994)
Mammals: Davies & Vanden Berghe (1994)
Snakes: Spawls (1978)
Woody plants: Beentje (1994).

4.2 Site Accounts

(ordered by site code)

1 Aberdare Mountains

0°08'S, 36°55'E, Central Province, Murang'a, Nyandarua and Nyeri Districts

179,900 ha (76,600 ha National Park, 108,400 ha Forest Reserve)

Altitude: 1,800–4,000 m

Status: National Park and Forest Reserves

Categories: Globally-threatened species, restricted-range species, Afrotropical Highlands biome species

Site description

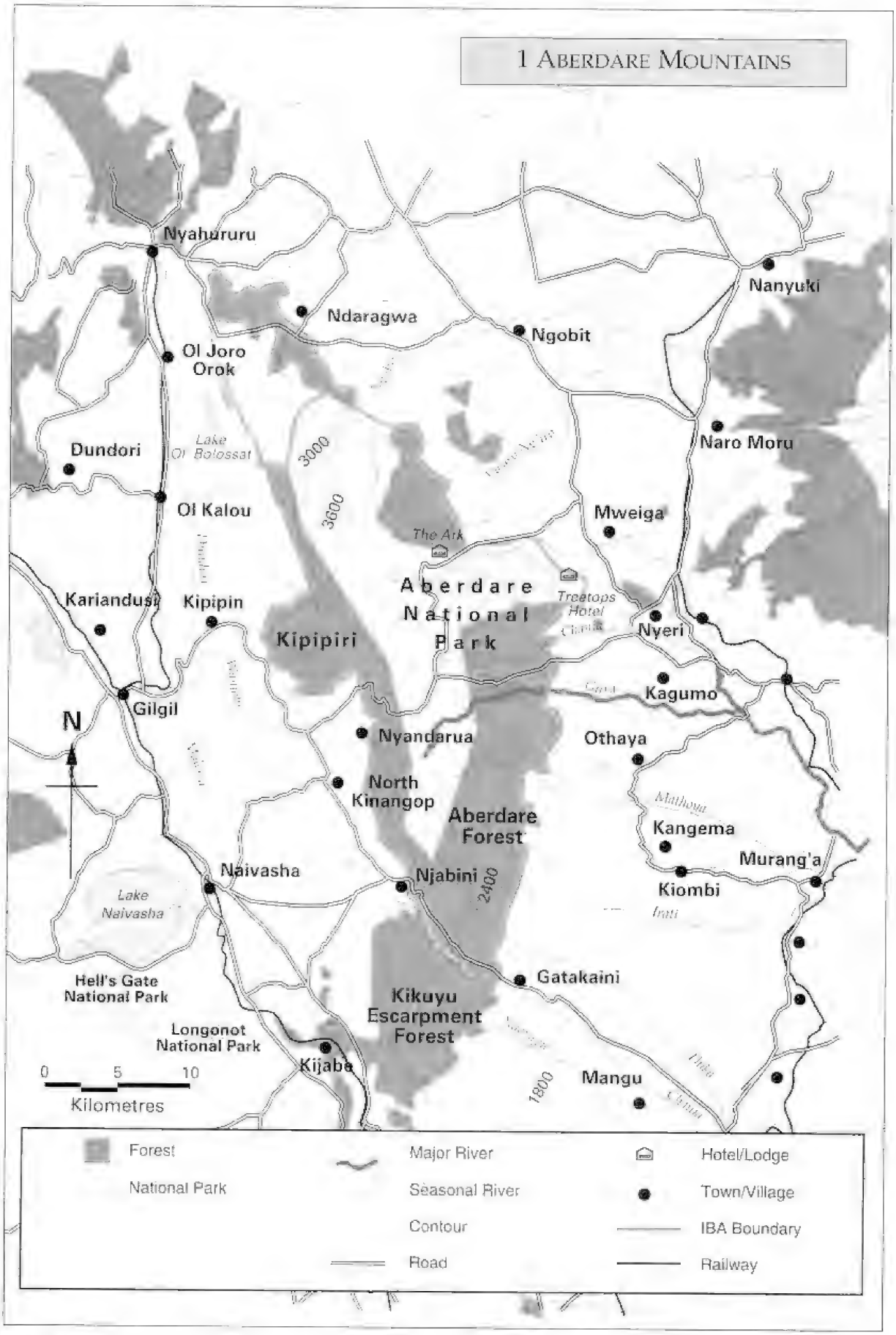
The Aberdare or Nyandarua mountains are an isolated volcanic range that form the easternmost wall of the Gregory Rift Valley, to the east of the high Kinangop/Laikipia plateau. They are around 100 km long from north to south (the northern end almost reaching the equator). There are two main peaks, Ol Donyo Lesatima (3,999 m) to the north and Kinangop (3,906 m) to the south, separated by a long 'saddle' of land above 3,000 m. The small peak of Kipipiri (3,349 m) flanks the main range to the west, linked to it by a formerly forested valley at around 2,700 m. Deep ravines cut through the forested eastern and western slopes and there are many clear streams and waterfalls. Mist and rain occur throughout much of the year, with precipitation varying from around 1,000 mm on the drier north-western slopes to as much as 3,000 mm in the south-east. The vegetation varies with altitude. A rich alpine and sub-alpine flora, including species of *Senecio*, *Lobelia*, *Erica*, *Helichrysum* and tussock grasses, gives way at around 3,000 m to bamboo *Arundinaria alpina* and then montane rainforest (mainly *Juniperus procera-Podocarpus falcatus-Nuxia congesta* forest on the western and north-western slopes, *Ocotea* forest on the south-east, and mixed *Podocarpus latifolius* forest on the east and on Kipipiri: Beentje 1990). Pockets of *Hagenia* forest occur in sheltered patches on the rolling moorland.

The National Park lies mainly above the tree line, with some forest and scrub at lower altitude in the so-called 'salient' near Nyeri. The Aberdares Forest Reserve (103,300 ha) occupies the lower slopes, in three main blocks that almost surround the Park, with Kipipiri Forest Reserve (5,100 ha) tacked on to the west. The southern boundary of the Aberdares Forest Reserve adjoins the Kikuyu Escarpment Forest (IBA 3). The Aberdares are an extremely important water catchment for the Tana River system, for the northern Ewaso Nyiro River and for Lake Naivasha, and provide much of the water supply for Nairobi and adjoining districts.

Birds

See box and Appendix 3 for key species. The Aberdares hold 52 of Kenya's 67 Afrotropical Highlands species, and six of the eight restricted-range species in the Kenyan Mountains Endemic Bird Area. Over 200 species are recorded in all, including African Green Ibis, African Cuckoo Hawk, Mountain Buzzard, Jackson's and Moorland Francolins, Hartlaub's Turaco and Cape Eagle-Owl. The Scarlet-tufted Malachite Sunbird is found on the high peaks, foraging largely on lobelias, while other montane sunbirds (including Tacazze, Golden-winged, Malachite and Eastern Double-collared) are common at slightly lower altitudes. The restricted-range Aberdare Cisticola appears to be locally common in tussock moorland.

Aberdare Cisticola


1 Aberdare Mountains
Nyahururu
Ndaragwa
Ngobit
Nanyuki
Ol Joro Orok
Dundori
Lake Ol Bolossat
Naro Moru
Ol Kalou
3000
3600
Mweiga
The Ark
Aberdare National Park
Treetops Hotel
Kariandusi
Kipipin
Kipipiri
Nyeri
Kagumo
Gilgil
N
Nyandarua
Othaya
North Kinangop
Aberdare Forest
Kangema
Murang'a
Kiombi
Naivasha
Njabini
2400
Lake Naivasha
Gatakaini
Hell's Gate National Park
Kikuyu Escarpment Forest
Longonot National Park
Kijabe
1800
Mangu
0 5 10
Kilometres
Forest
National Park
Major River
Seasonal River
Contour
Road
Hotel/Lodge
Town/Village
IBA Boundary
Railway

Globally-threatened species		
*Sharpe's Longclaw	Provisionally Vulnerable: (Bennun & Njoroge 1996)	Uncommon resident of the southern slopes, in grassland (Zimmerman *et al.* 1996). Current status uncertain
*Abbott's Starling	Vulnerable	In forest. Status uncertain; may be only a rare visitor
*Aberdare Cisticola	Provisionally Vulnerable: (Bennun & Njoroge 1996)	Locally common in tussock grassland
*Jackson's Widowbird	Near-threatened	Status uncertain

**also restricted-range species*

Other restricted-range species	
Jackson's Francolin	Common in high forest and moorland scrub
Hunter's Cisticola	Common at the forest edge

Regionally-threatened species		
African Green Ibis	Vulnerable	Few records; in forest and on wooded moorland streams
Ayres's Hawk Eagle	Vulnerable	Scarce in montane forest
African Crowned Eagle	Vulnerable	At low densities in montane forest
Striped Flufftail	Vulnerable	In alpine grassland; rarely recorded
Baillon's Crake	Vulnerable	Uncommon, in montane swamps
African Grass Owl	Vulnerable	In alpine grassland. No recent records
Cape Eagle Owl	Vulnerable	Local, on moorland cliffs and crags
Long-tailed Widowbird	Vulnerable	Status uncertain

Other wildlife

The threatened Bongo *Tragelaphus eurycerus* occurs in the forest but sightings are on the decline (Cheffings 1997). Other threatened mammals include Leopard *Panthera pardus*, Black Rhinoceros *Diceros bicornis*, African Elephant *Loxodonta africana* (some 1,500 are resident: Lindsay 1994) and Giant Forest Hog *Hylochoerus meinertzhageni* (now reduced in numbers by rinderpest and the introduction of Lion *Panthera leo*: Lindsay 1994). The African Golden Cat *Felis aurata*, a rare species in Kenya, also occurs (Hardy 1979, Watson 1980). Endemic small mammals include Aberdare Mole-shrew *Surdisorex norae* and Aberdare Mole-rat *Tachyoryctes audax*. The Montane Viper *Vipera hindii* occurs only here and on Mt Kenya (IBA 5), and the Aberdares hold several amphibians that are endemic to the central Kenyan highlands, including *Hyperolius montanus*, *H. cystocandicans*, *Rana wittei* and *Phrynobatrachus kinangopensis* (Spawls 1978, Duff-MacKay 1980). The butterfly *Neptis kikuyuensis* is endemic to forests in this IBA and on the Kikuyu Escarpment (IBA 3), and *Charaxes nandina*, endemic to central Kenya, has also been recorded (Larsen 1991).

Notable plants include the Aberdare endemics *Lobelia deckenii sattimae* and *Helichrysum gloria-dei*, and the Aberdare/Mt Kenya endemics *Lobelia bambuseti*, *Senecio keniensis*, *Senecio johnstonii battiscombei var. battiscombei* and *Senecio keniodendron*. The Aberdares are rich in the genus *Alchemilla*, including *A. hageniae* (endemic), *A. argyrophylla* (also on Mt Kenya), *A. cyclophylla* (also on Mt Kenya) and the rare *A. microbetula* (also on Mt Elgon).

Conservation issues

The Aberdare Mountains are one of Kenya's major water catchment areas, surrounded for the most part by intensive, small-scale agriculture. The high moorland is well protected and appears relatively safe, but habitat on the lower slopes has been severely damaged in recent years. Forest destruction

and degradation is the major threat to the site, through agricultural encroachment, illegal *Cannabis sativa* gardens, poaching of valuable trees and forest grazing of livestock. Forest fires, either accidental or deliberately set (especially by honey collectors), have destroyed or damaged large tracts of forest during recent dry periods. Human–wildlife conflict has long been intense around the borders of the National Park 'salient' and the forest reserves. Marauding animals regularly damage crops, and occasionally kill or injure people. Parts of the 'salient' are already fenced, and there are plans to continue fencing sections of the forest reserves where problems are most severe. As in many of Kenya's indigenous forests, management is presently inadequate, and is likely to remain so until an integrated management plan is supported by sufficient resources to put it into action.

On the moorland, the status of two of the threatened species – Sharpe's Longclaw and Aberdare Cisticola – remains little known, and needs investigation.

The unusual vegetation, rugged terrain, streams and waterfalls combine to create an area of great scenic beauty in the National Park, which has tremendous potential for eco-tourism. This potential is only partially realised at present thanks to poor access roads and a lack of safe walking trails.

Further reading

Agnew 1985, IUCN/UNEP 1987, Lindsay 1994

Alpine Chat

2 KIANYAGA VALLEYS

0°30'S, 37°20' E, Central Province, Kirinyaga District

Area undefined: minimum 12,000 ha

Altitude: 1,200–1,600 m

Status: Unprotected private land

Categories: Globally-threatened species, restricted-range species

Site description

Kianyaga comprises a landscape of ridges and steep-sided valleys on the south-eastern slopes of Mt Kenya. These valleys often hold small, swampy streams, which drain into tributaries of the Tana River. The area is entirely settled and cultivated, predominantly with coffee and maize; arrowroot and other crops are grown in the valleys. The remaining small areas of natural wetland include plants such as *Triumfetta tomentosa*, *Croton macrostachyus* and *Cyperus rotundus*. Scattered indigenous trees still remain, mainly *Prunus africana*, *Ficus natalensis* and *Millettia dura*. Thickets of the exotic *Lantana camara* occur at the edges of cultivation, in fallow farmland and unweeded coffee plantations, and in inaccessible parts of the valleys.

Globally-threatened species

*Hinde's Babbler	Endangered	Babbler groups occupy many of the valleys and swamps, with an estimated total population size of 500+ (mean group size 4.5 birds, mean density 3.8 birds/km²: Njoroge & Bennun, in press)

**also restricted-range species*

Birds

See box for key species. This is the centre of abundance for the threatened, restricted-range Hinde's Babbler, a species endemic to central Kenya. The diversity of other birds is low; a six-month study carried out in 1993 recorded only 94 species, all characteristic of disturbed habitats in the central highlands.

Other wildlife

Very little other wildlife of note occurs.

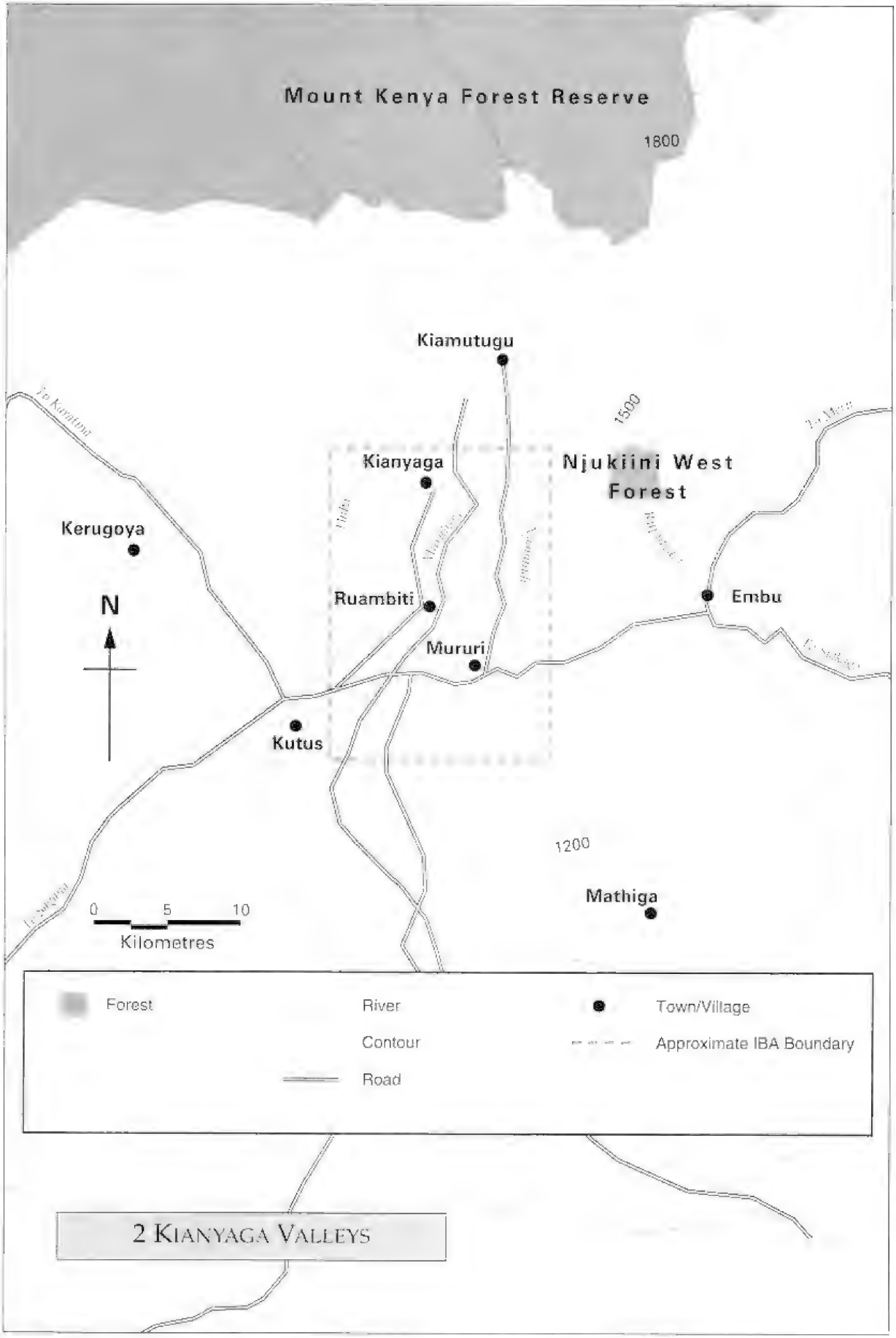
Conservation issues

This site is critically important for the conservation of Hinde's Babbler. The babblers live in groups in the river valleys and swamps, and depend on small thickets of the exotic *Lantana camara* for shelter and nest sites. The fast-growing human population is intensifying pressure on the land. Almost all natural wetland vegetation has been cleared for cultivation, and smaller and smaller areas are left fallow. Babbler breeding success is already low, apparently as a result of human disturbance (Njoroge & Mutinda 1996), and the birds are also hunted for food (Njoroge 1994). With adequate thicket cover, the babblers can persist in habitats severely modified by people. However, their conservation in this agricultural setting will require innovative approaches – perhaps the setting aside of a number of small sanctuaries centred on schools and other public institutions, as well as an extensive public education campaign.

Further reading

Plumb 1979, Turner 1992, Njoroge 1994, Njoroge & Bennun, in press, Njoroge *et al.*, in press

Hinde's Babbler



2 KIANYAGA VALLEYS

3 Kikuyu Escarpment Forest

0°56'S, 36°40'E, Central Province, Kiambu District (with very small sections in Nyandarua and Murang'a Districts, and in Rift Valley Province, Nakuru District)

37,600 ha

Altitude: 1,800–2,700 m

Status: Forest Reserve

Categories: Globally-threatened species, restricted-range species, Afrotropical Highlands biome species

Site description

The Kikuyu Escarpment Forest lies 30 km north north-west of Nairobi, and covers the eastern slopes of the escarpment from about 2,700 m in the north-west (bordering grassland at the edge of the Kinangop Plateau, IBA 3) to around 2,050 m in the east, where it borders agricultural land. The main block of forest (sometimes called Kieni) lies either side of the Kamae-Kieni-Thika road, and is bounded to the north by the Chania River; northwards it is continuous with the forest of the southern Aberdare Mountains (IBA 1). On the south-west, a narrow strip extends along the wall of the Rift Valley, beyond Kijabe, down to about 1,800 m. To the south, the forest has been much fragmented, and there are only scattered remnants towards its limits (including the so-called Gatamaiyu Forest, near Uplands). The topography is rugged, with many steep-sided valleys containing fast-flowing permanent streams. Mean rainfall is approximately 1,500 mm per year, varying with location. Mixed bamboo and forest in the higher north-west sector give way below 2,400 m to broad-leaved forest, with species of *Ocotea*, *Podocarpus*, *Macaranga*, *Neoboutonia* and *Strombosia* prominent among the trees; tree-ferns, *Cyathea manniana*, are also conspicuous. The escarpment strip consists of remnant *Juniperus* forest (Beentje, 1990). The forest was logged over extensively in the 1950s and 1960s, but many parts in the main block have regenerated well.

As well as several roads, a major water pipeline passes through the forest from Sasumua Dam, which supplies Nairobi with water. Judging from aerial photography mapped in Blackett (1994e), slightly more than half of the gazetted area is now

Globally-threatened species

*Abbott's Starling	Vulnerable	The main block (Kieni) is one of the most consistent sites for this little-known species, where it has been recorded almost the whole year around (Taylor & Taylor 1988); it is also regularly recorded in the southern remnant forest patch, Gatamaiyu

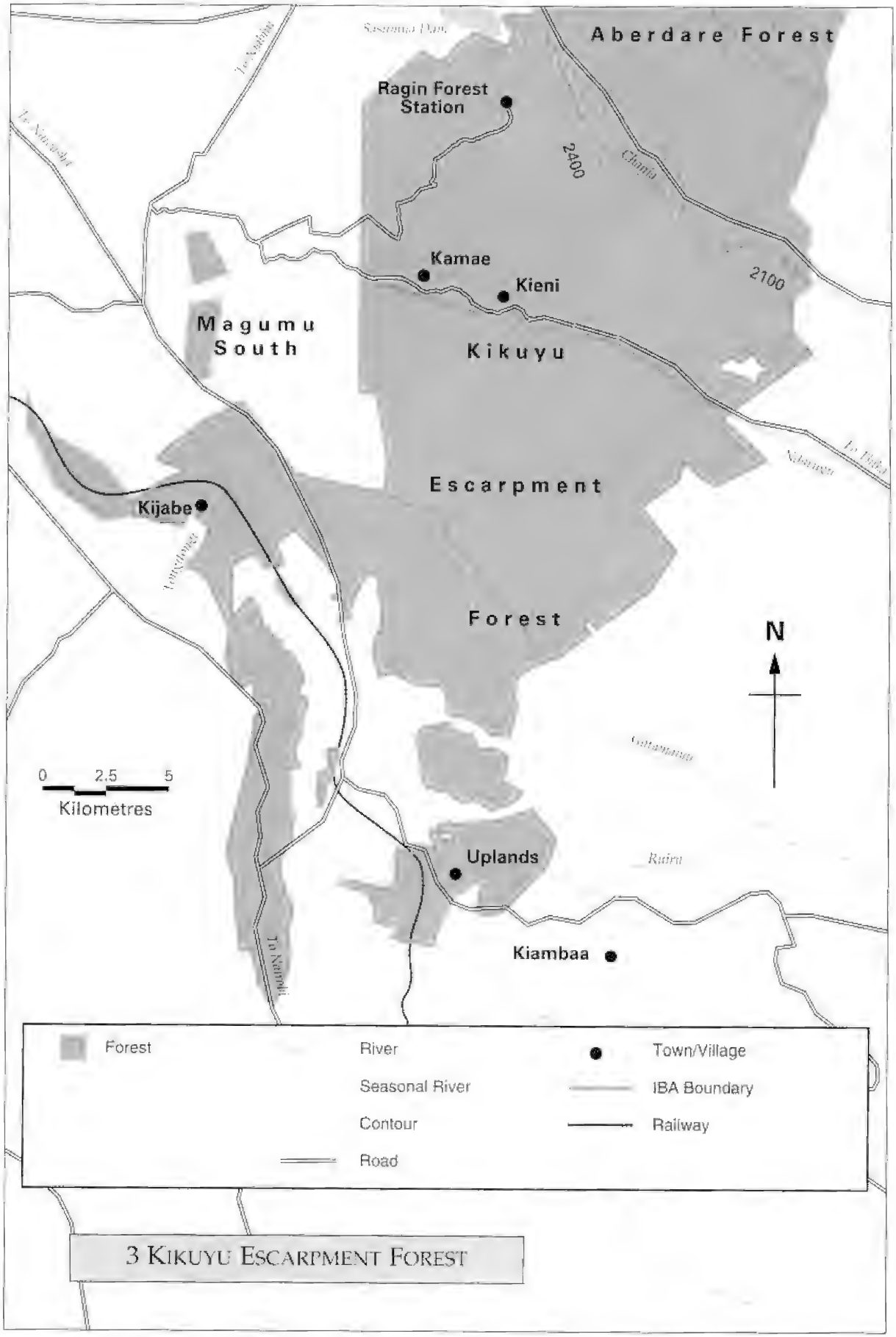
*also restricted-range species

Other restricted-range species

Jackson's Francolin	Common in the higher forest
Hunter's Cisticola	Common at forest edge and in scrub

Regionally-threatened species

African Green Ibis	Vulnerable	Regularly recorded; probably resident
Ayres's Hawk Eagle	Vulnerable	Scarce resident
African Crowned Eagle	Vulnerable	Resident in small numbers
Red-chested Owlet	Vulnerable	Appears to be resident (Taylor & Taylor 1988)



3 KIKUYU ESCARPMENT FOREST

closed-canopy forest, most of it in a single block in the east-central part of the Reserve. There are extensive areas of plantation and cleared land on the western perimeter of this main block, and the south-western strip and southern sections are a patchy mosaic of degraded forest remnants, scrub, cultivation and plantation.

Birds

See box and Appendix 3 for key species. This forest has a rich avifauna, characteristic of the central Kenyan highlands but with a composition different to that of the nearby Aberdare Mountains (IBA 1). At least 39 of Kenya's 67 Afrotropical Highlands biome species occur. The forest forms the western limit in Kenya for Barred Long-tailed Cuckoo, Trumpeter Hornbill, Orange Ground Thrush and Abbott's Starling, and the eastern limit for Red-chested Owlet (Taylor & Taylor 1988); none of these species is known to be present on the Aberdare Mountains.

Other wildlife

African Elephants *Loxodonta africana* are present in good numbers at times; this population appears to move back and forth between the Kikuyu Escarpment Forest and the Aberdare Mountains. Three near-endemic butterflies occur, namely *Charaxes nandina*, *Neptis kikuyuensis* and *N. kakuma* (Larsen 1991). Little is known about the other biodiversity values of this site.

Conservation issues

The human pressure on this forest has been increasing steadily over time. Encroachment along the southern and western boundaries is intensifying, and at lower altitudes large parts have been destroyed (e.g. Adel & Gachanja 1997). Tree poaching has become rampant in the forest bordering the main Kieni-Thika road, and in the southern remnants. It is evident that the Forest Department is able to exert very little control. The conservation value of the forest must be more widely recognised, and adequate effort put into policing and managing it — preferably as a joint operation between Forest Department and Kenya Wildlife Service under their Memorandum of Understanding. Environmental education is also necessary, as the people around the forest perceive that there is little value in conserving it, and are generally very hostile to the Forest Department (Adel & Gachanja 1997). This forest is close to Nairobi, easily accessible, scenically attractive, has a wide range of interesting and unusual birds, and is already a favourite site for local and foreign birdwatchers. It has excellent potential for eco-tourism.

Further reading

Taylor & Taylor 1988, Blackett 1994e, Malcolm-Coe 1994, Gardner 1996

Barred Long-tailed Cuckoo

4 Kinangop Grasslands

0°42'S, 36°34 E, Central Province, Nyandarua District
(with a small section in Rift Valley Province, Nakuru District)
77,000 ha
Altitude: 2,400–2,700 m
Status: Unprotected, mainly private land
Categories: Globally-threatened species, restricted-range species

Site description

These montane grasslands lie on the Kinangop Plateau, a wide stretch of land bounded by the forests of the Aberdare Mountains (IBA 1) and Kikuyu Escarpment (IBA 4) to the east and south, and by a steep scarp dropping to the Rift Valley floor on the west. To the west and north, the IBA boundary follows the 2,400 m contour. Rainfall averages around 1,000 mm per year, but the southern part is wetter than the north, which lies in the rain shadow of the Aberdares. The landscape is generally flat, sloping gently upwards to the base of the Aberdare Mountains, but dissected by valleys bearing streams that drain into the Malewa and Karati Rivers (see Lake Naivasha, IBA 48). Originally, the entire plateau was covered with almost treeless, tussocky grassland, including many tussock bogs in the swampy valleys. Characteristic tussock grasses include *Andropogon amethystinus, Cymbopogon nardus, Digitaria diagonalis, Eleusine inegeri, Eragrostis botryodes, Hyparrhenia hirta, H. lamba* and *Pennisetum hohenackeri*. Since the 1960s the area has been settled by the Kikuyu people, whose livelihood revolves around small-scale farming. Large areas of land have been ploughed for cultivation (mainly maize, wheat, cabbages and potatoes) or to remove the tussock grass species, which livestock find unpalatable. Woodlots of introduced trees, such as *Eucalyptus globulus, Acacia mearnsii, Pinus radiata* and *Cupressus lusitanica*, now dot the landscape. Many of the wetlands have been drained directly or by planting water-thirsty exotic trees.

Birds

See box for key species. This is probably the world stronghold of Sharpe's Longclaw, a threatened

Globally-threatened species

Pallid Harrier	Near-threatened	Occurs on passage
*Sharpe's Longclaw	Provisionally Vulnerable (Bennun & Njoroge 1996)	Confined to grassland, preferring short grass fields with tussocks, with densities of 0.8 individuals/ha in good habitat (Muchai 1997)
*Aberdare Cisticola	Provisionally Vulnerable (Bennun & Njoroge 1996)	Expected to occur in the higher parts of the plateau
*Jackson's Widowbird	Near-threatened	Seasonal visitor; nests in tussock grasslands, and at times in wheat fields (L. Bennun, unpubl. data)

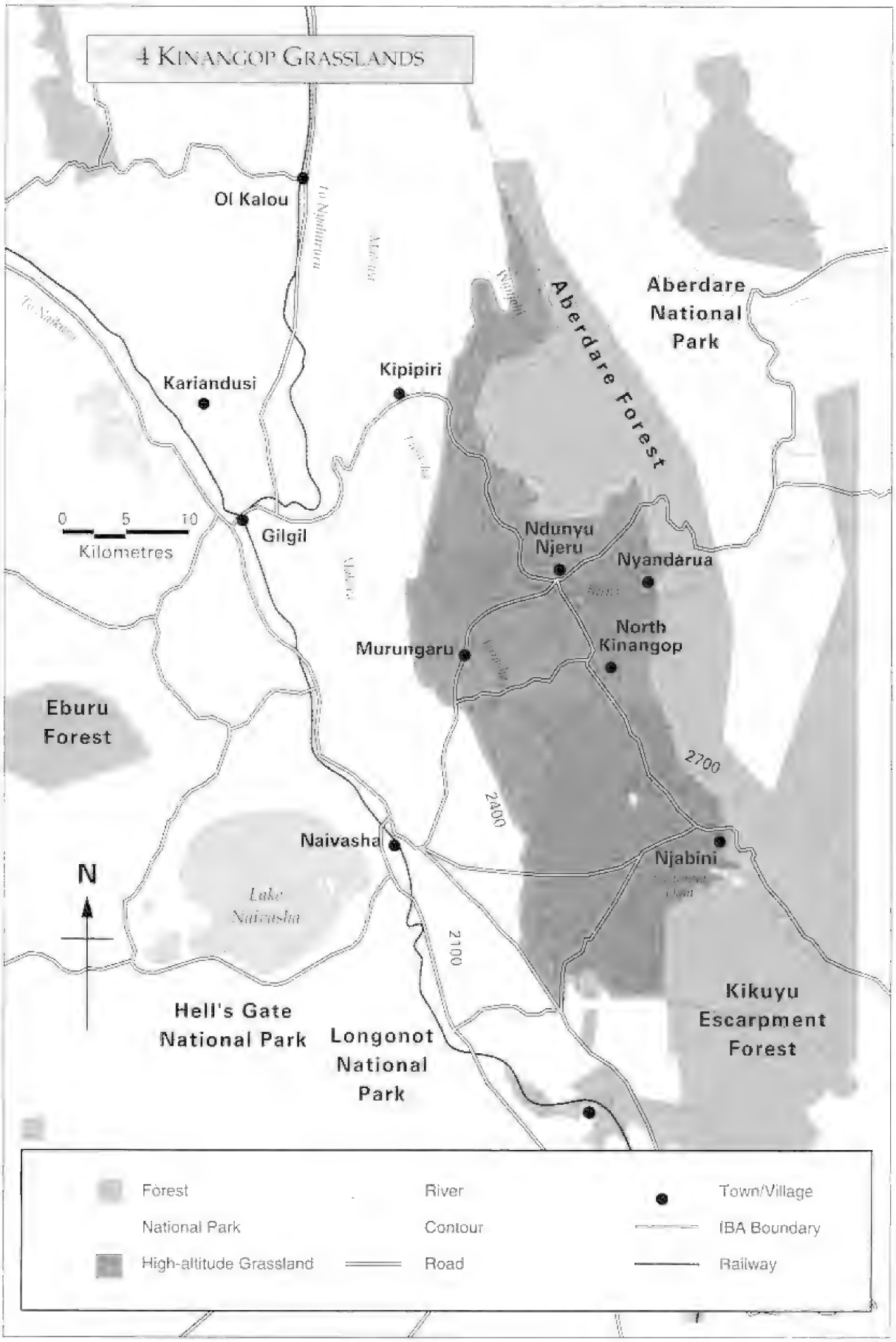
**also restricted-range species*

Other restricted-range species

Hunter's Cisticola		Common in scrubby areas

Regionally-threatened species

Great-crested Grebe	Critical	Occasional records from dams, status uncertain
Long-tailed Widowbird	Vulnerable	Resident; nests in tussock grasslands


4 KINANGOP GRASSLANDS
Ol Kalou
Kariandusi
Kipipiri
Gilgil
Aberdare Forest
Aberdare National Park
Ndunyu Njeru
Nyandarua
North Kinangop
Murungaru
Eburu Forest
Naivasha
Njabini
Lake Naivasha
Hell's Gate National Park
Longonot National Park
Kikuyu Escarpment Forest
2700
2400
2100
0 5 10
Kilometres
N
Forest
National Park
High-altitude Grassland
River
Contour
Road
Town/Village
IBA Boundary
Railway

Kenya endemic. Aberdare Cisticola is thought to occur in the higher parts of the IBA, close to the Aberdare Mountains, but its status is uncertain. The grasslands support a distinctive avifauna that includes localised species such as Black-winged Plover, Wing-snapping Cisticola and Jackson's and Long-tailed Widowbirds. Large numbers of Palaearctic migrants use the area on passage, notably Eurasian Hobby, Common (Steppe) Buzzard, Black Stork, Eurasian Swift, Eurasian Bee-eater, Yellow Wagtail and Northern Wheatear.

Other wildlife

The fauna and flora of these grasslands have been little studied. Very few large wild mammals survive on the Kinangop, but many smaller species that are confined to highland grassland can be expected. The frogs *Hyperolius montanus* and *Phrynobatrachus kinangopensis* and the Kenya Horned Viper *Bitis worthingtonii* are recorded only in Kinangop and a few other sites in the Kenyan highlands (Sprawls 1978, Duff-MacKay 1980). *Hyperolius montanus* was considered secure in 1980, but it is a montane grassland species and may now be under threat.

Conservation issues

Kenya's unique highland grasslands are not included in any protected areas, and are rapidly vanishing. The remaining grassland on the Kinangop plateau is now mainly modified grazing land, sometimes in rotation with arable cropping. The ecological character of the plateau is changing remarkably fast. Destruction of indigenous forest on the Aberdare slopes, drainage of wetlands and afforestation with exotic trees has resulted in a warmer, drier climate, with less frequent frosts and less regular mist and rain. The lack of frosts (and unreliable payments by large-scale milk purchasers) tends now to make crop cultivation a more attractive land use than livestock rearing. Increasing human population density has put more pressure on the land, leading to smaller average land holdings and higher stocking rates. These forces have resulted in a rapid reduction in the area of grassland, especially tussock grassland, and that which remains is increasingly fragmented (Muchai 1997). Both these trends are known to have serious negative consequences for Sharpe's Longclaw (Lens *et al.*, in press, a). The longclaw seems able to co-exist with livestock, provided that adequate tussock cover remains, but cannot survive in farmed fields: it requires grass tussocks for feeding, roosting and nesting (Muchai 1997). It is also severely affected by habitat fragmentation (Lens *et al.*, in press, b).

Conservation of this IBA represents a major challenge. Ecological and economic studies are urgently required to assess what land-use regimes are compatible with Sharpe's Longclaw conservation, and what economic opportunity costs these entail. Land should be purchased for a model Sharpe's Longclaw reserve that can fulfil an educational and demonstration function. Potential small nature reserves on common land, or in institutions such as schools, need to be identified and designated. Fortunately, environmental awareness is growing among younger people in the area. A conservation action group, 'Friends of Kinangop Plateau' has recently been formed in the North Kinangop area, and deserves active support.

Parts of this IBA have now been well surveyed, but additional survey work is needed in the northern sector. There are reports of Sharpe's Longclaw at around 2,300 m near Lake Ol'Bolossat (some 18 km north north-west of Wanjohi, at the IBA's northern limit). If confirmed, these would make it appropriate to extend the northern boundary of the IBA. The presence of Aberdare Cisticola at the base of the Aberdare Mountains also requires confirmation.

Sharpe's Longclaw

Further reading

Lens 1995, Muchai 1997, Lens *et al.* in press a,b

5 Mt Kenya

0°10'S, 37°20'E, Central Province, Kirinyaga, Nyeri
and (marginally) Laikipia Districts, and Eastern Province,
Embu, Tharaka-Nithi, Meru and Nyambene Districts

271,000 ha

Altitude: 1,600–5,200 m

Status: Forest reserve (199,500 ha) and National Park (71,500 ha)

Categories: Globally-threatened species, restricted-range species,
Afrotropical Highlands biome species

Site description

An imposing extinct volcano that dominates the landscape of the Kenyan highlands east of the Rift, Mt Kenya lies about 140 km north north-east of Nairobi, with its northern flanks across the equator. The mountain's sprawling slopes are cloaked in forest, bamboo, scrub and moorland, giving way on the high central peaks to rock, ice and snow.

Mt Kenya is an extremely important water catchment area, supplying the Tana and Northern Ewaso Ng'iro systems. The wet south-eastern slopes (with rainfall up to 2,500 mm per year) hold luxuriant rain forest up to 2,400 m, with valuable timber trees such as Camphorwood *Ocotea usambarensis*. Five other main forest types are recognised (Beentje 1990, Blackett 1994f), including *Newtonia buchananii* forest (lower eastern slopes, up to 1,800 m); *Juniperus procera-Nuxia congesta-Podocarpus falcatus* forest (eastern slopes, to 2,300 m); forest dominated by *Croton megalocarpus, Brachylaena huillensis* and *Calodendrum capense* (south-western slopes, up to 1,900 m); more open *Juniperus procera-Olea europaea* forest (on the drier western and north-western slopes, to c. 2,300 m); and mixed *Podocarpus latifolius* forest (north-western slopes, up to 2,600 m). From approximately 2,400 m altitude, the forest gives way to dense stands of bamboo *Arundinaria alpina*, with scattered trees. There is no forest on the dry northern slopes, which receive as little as 800 mm of rain per year and support only scrubby vegetation.

Above about 2,850 m, the bamboo merges with an open woodland of *Hagenia abyssinica* trees and *Hypericum* shrubs. This in turn grades into *Erica* heathland above 3,000 m, where 'everlasting' flowers, *Helichrysum* spp., are conspicuous. Above this, the afro-alpine moorlands are outstanding both scenically and floristically, with giant groundsels *Senecio keniodendron* and *S. johnstonii battiscombei*, giant lobelias *Lobelia deckenii keniensis* and *L. telekii*, and various tussock grasses.

The forest (199,500 ha) was gazetted as Forest Reserve in 1943 and is administered from 15 Forest Stations in six administrative districts. Blackett (1994f) estimated that around 61,000 ha of the gazetted area was closed-canopy forest. Almost all of this lies between 2,000–2,900 m altitude, with only small fragments on the lowest slopes, down to 1,600 m. Bamboo and bamboo/forest mosaic make up another 63,000 ha, forest and scrub 20,000 ha, with some 20,500 ha of plantations and 35,000 ha of non-forest, including scrub, grassland and cultivation. The National Park covers 71,500 ha, almost entirely above the tree-line; it includes all the land above 3,200 m, with two small 'salients' extending lower down along the Sirimon and Naro Moru tracks.

Birds

See box and Appendix 3 for key species. Mt Kenya is undoubtedly a stronghold for the threatened and little-known Abbott's Starling, even though there are few recent records. It has a rich montane bird fauna, with 53 out of Kenya's 67 African Highlands biome species, at least 35 forest-specialist species (Bennun *et al.*, in press), and six of the eight species that make up the Kenyan Mountains Endemic Bird Area. The African Green Ibis feeds in marshy forest glades and the rare and little-known race *graueri* of the African Long-eared Owl has been recorded from the high forest. The Scarlet-tufted Malachite Sunbird is particularly common on the high moorland.

Other wildlife

Red Data Book mammal species found in the forest include Leopard *Panthera pardus*, Bongo *Tragelaphus eurycerus*, Giant Forest Hog *Hylochoerus meinertzhageni*, Black Rhino *Diceros bicornis* and African

Elephant *Loxodonta africana*, together with the uncommon central Kenya race of Black-fronted Duiker *Cephalophus nigrifrons hooki*. Levels of endemism among the small mammals depend on the classification adopted. Notable Mt Kenya taxa include the Mt Kenya Mole-shrew *Surdisorex polulus*, Mt Kenya Mole-rat *Tachyoryctes rex*, Mt Kenya Thicket Rat *Grammomys gigas*, Highland Musk Shrew *Crocidura allex alpina* and East African Rock Hyrax *Procavia johnstoni mackinderi* (Coe & Foster 1972, Young & Evans 1993, Davies & Vanden Berghe 1994). The Mt Kenya Bush Viper *Atheris desaixi* and Mt Kenya Soft-horn Chameleon *Chamaleo schubotzi ate* notable endemic reptiles, while the Montane Viper *Vipera hindii* is found only on Mt Kenya and the Aberdare Mountains (IBA 1). The butterfly *Capys meruensis* is restricted to the Mt Kenya area (Larsen 1991).

Endemics or near-endemics among the alpine flora include *Senecio keniodendron* (also on the Aberdares), *Senecio keniensis keniensis*, *Lobelia deckenii keniensis* and *L. bambuseti* (also on the Aberdares), *Alchemilla argyrophylla* and *A. cyclophylla* (both also on the Aberdares). In the forest, endemics or near-endemics include the rare shrubs *Ixora scheffleri keniensis*, *Pavetta hymenophylla*, *Maytenus keniensis* and *Embelia keniensis* and the climber *Rubus keniensis*.

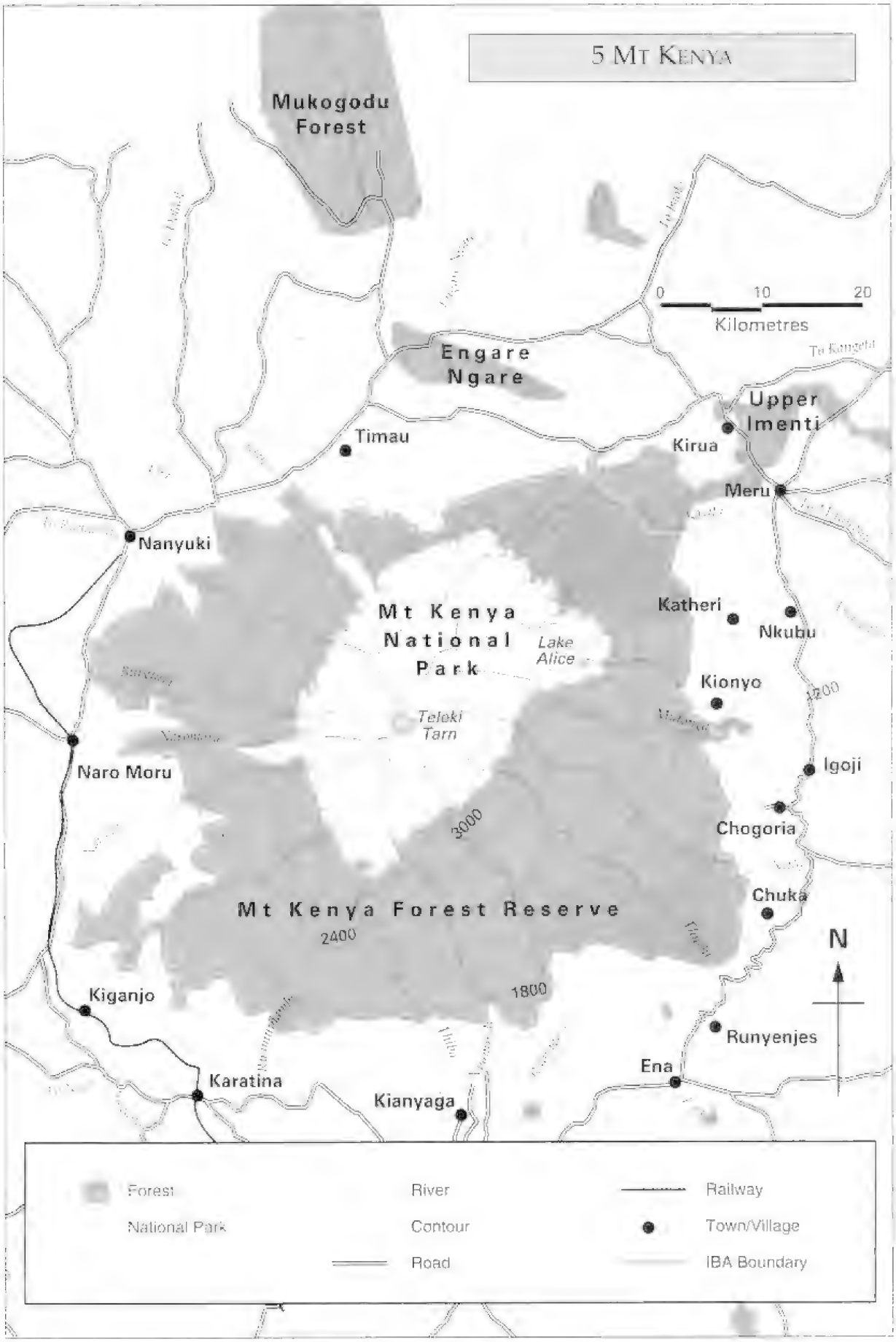
Conservation issues

Apart from its biodiversity importance, Mt Kenya (or Kirinyaga) has enormous traditional religious significance for the Kikuyu people who live around it. Numerous important traditional uses are made of the forest. The mountain is a vital water catchment for the Tana and Northern Ewaso Ng'iro rivers, while the moorland (with its extraordinary afro-alpine vegetation) and the peaks attract a steady stream of tourists.

Unfortunately, the Forest Reserves on Mt Kenya appear to have suffered an almost complete breakdown of forest protection. Most of the forest has already been logged over for valuable trees such as Camphorwood *Ocotea usambarensis*, Meru Oak *Vitex keniensis* and *Podocarpus* species. Exploitation of indigenous species is presently banned on Mt Kenya, as in most Kenyan forests, but demand for indigenous timber continues to be extremely high. Illegal removal of the remaining timber trees, especially *Ocotea*, has reached epidemic proportions. The Forest Department, hampered by poor roads, a lack of transport and equipment, and underpaid and demotivated personnel, is unable to control the situation. The result is much continuing damage to the forest.

Allied to this is the problem of encroachment and squatters in the forest. Population densities around the mountain are high, especially in the south-east, and encroachment has fragmented and destroyed the lower altitude forest over a number of years. Many former Forest Department staff and sawmill workers (some of them made redundant when sawmilling of indigenous timber ceased) are living and farming within the reserves. The reinstatement in 1993 of the controversial 'shamba' system of plantation management, where small-scale farmers plant crops alongside saplings, has resulted in farms high on the mountainside. This has created enormous problems in policing forest use. Such 'farming' includes the cultivation of illegal but lucrative gardens of *Cannabis sativa*, which are widespread in forest clearings on the lower slopes. Forest grazing is a serious concern, although

Kenrick's Starling


5 Mt Kenya
Mukogodu Forest
Engare Ngare
Timau
Upper Imenti
Kirua
Meru
Nanyuki
Mt Kenya National Park
Lake Alice
Teleki Tarn
Katheri
Nkubu
Kionyo
Igoji
Chogoria
Chuka
Naro Moru
Mt Kenya Forest Reserve
2400
3000
1800
1200
Kiganjo
Karatina
Kianyaga
Runyenjes
Ena
N
0
10
20
Kilometres
Forest
National Park
River
Contour
Road
Railway
Town/Village
IBA Boundary

Globally-threatened species

Lesser Kestrel	Vulnerable	Palaearctic passage migrant, on the moorland
*Jackson's Widowbird	Near-threatened	In grassland up to 3,000 m
*Sharpe's Longclaw	Provisionally Vulnerable (Bennun & Njoroge 1996)	Known from the north-west slopes (Zimmerman *et al.* 1996), but present status uncertain
*Abbott's Starling	Vulnerable	Sporadic records; probably nomadic in search of fruiting trees (Bennun 1994b)

**also restricted-range species*

Other restricted-range species

Jackson's Francolin	Common in montane forest and scrub
Hunter's Cisticola	Common in forest-edge habitats and scrub
Kenrick's Starling	Apart from the nearby Nyambeni Hills, Mt Kenya is the only Kenyan site for this species

Regionally-threatened species

African Green Ibis	Vulnerable	Scarce resident, foraging in forest glades and along streams
Lammergeier	Vulnerable	Formerly nested on moorland cliffs; no recent records
Ayres's Hawk Eagle	Vulnerable	Scarce resident
African Crowned Eagle	Vulnerable	An important site for this low-density species
African Grass Owl	Vulnerable	No recent records
Cape Eagle Owl	Vulnerable	Nests on moorland crags
Purple-throated Cuckoo-shrike	Vulnerable	Uncommon in montane forest
Long-tailed Widowbird	Vulnerable	In tall grassland outside forest; status uncertain

theoretically banned. The scale of the problem has become evident during recent droughts, when many thousands of hectares of precious forest have been set ablaze and destroyed by land-hungry people, expecting to be able to move in and farm the area thereafter.

'Problem animals' are a major issue around Mt Kenya, where substantial populations of large forest mammals close to intensive agriculture create severe conflicts. Most difficulties are caused by African Elephants *Loxodonta africana*, African Buffalos *Syncerus caffer*, Bushpigs *Potamochoerus porcus* and Olive Baboons *Papio anubis* (KIFCON 1992). Elephants account for the bulk of both crop damage and human injuries and deaths. Electrical fencing of the Forest Reserves is an expensive solution with a number of attendant problems, but may become necessary in some areas.

On the other side of the coin, illegal hunting of wildlife is also rampant. The main target species are African Buffalo, Bush Pig and Bushbuck *Tragelaphus scriptus*. Hartlaub's Turaco is also hunted for its red flight feathers, which are in demand for manufacturing fishing flies.

Elephant pressure on the indigenous forest is

also high, now that their traditional migration routes outside the mountain are cut off, and debarking and uprooting of forest trees is a problem. In some areas the animals appear to have developed a particular taste for valuable trees such as Camphorwood (KIFCON 1992). Buffalo similarly damage the *Hagenia-Hypericum* ground community.

Threats within the National Park are much less severe, although there has been concern about damage to vegetation and littering by the many visitors following the standard walking routes to the peaks (Shah & Upadhyaya 1995). Food and rubbish left by visitors has also caused a population boom of hyrax and rodents in the Teleki Valley, which is damaging vegetation (Kokwaro & Beck 1987). Although this is a very visible problem, it is localised and affects a small proportion of the moorland area. Poaching of wildlife in the Park has been exacerbated by the reinstated 'shamba' system, allowing poachers easy access to the upper reaches of the forests and to the moorland (Lockwood 1995).

Mt Kenya urgently needs a coherent management plan and serious joint action by Forest Department and Kenya Wildlife Service to address the fundamental issues of forest policing, squatters and problem animals (KIFCON 1992, Lockwood 1995). Some of this work was to have been undertaken by the European Union-funded project COMIFOR (Community Participation in Indigenous Forest Conservation), which has unfortunately now ceased operation. As things stand, irreparable environmental destruction is continuing on a scale as grand as the mountain itself.

The avifauna of Mt Kenya is reasonably well-known but there is very little information on the seasonality, distribution and habitat requirements of the threatened birds, particularly Abbott's Starling. The status of Sharpe's Longclaw is also uncertain. Future research should target these species in particular.

Further reading

Coe 1967, Allan 1981, Rehder *et al.* 1981, KIFCON 1992, Lubanga 1992, Fairweather 1993, Milner *et al.* 1993, Young & Evans 1993, Blackett 1994f, Lockwood 1995

Abbott's Starling

6 Mukurweini Valleys

0°30'S, 37°07'E, Central Province, Nyeri District

Area undefined: at least 20,000 ha

Altitude: 1,500–1,600 m

Status: Unprotected private land; 10 ha private bird sanctuary

Criteria: Globally-threatened species, restricted-range species

Site description

This IBA consists of steep-sided stream and river valleys with Lantana thickets, on the lower south-east slopes of the Aberdare Mountains (IBA 1), in the upper catchment of the Tana River. The area of the IBA cannot be precisely defined without further survey work, but it includes at minimum an area of 20,000 ha in the catchments of the Thiha and Sagana Rivers on either side of the Thangathi-Kanunga road near Mukurweini town. This is a zone of high agricultural potential and is intensively cultivated, the major crops including coffee, maize and arrowroot. Little natural vegetation remains in most places, apart from scattered indigenous trees such as *Newtonia buchananii* and *Ficus thonningii*. Thickets of the exotic *Lantana camara* occur at the edges of cultivation, in fallow farmland and unweeded coffee plantations, and in inaccessible river valleys.

Birds

See box for key species. Hinde's Babbler, a threatened Kenya endemic with a very restricted range, occurs at relatively high densities. It is confined to the valleys, with group territories centred on patches of the exotic shrub *Lantana*, which the babblers depend on for shelter and nest sites. Other bird species are typical of forest edge and scrub habitats in the central Kenya highlands, but species diversity in this agricultural landscape is low.

Conservation issues

This is one of the few areas where Hinde's Babbler occurs in reasonable numbers. Further survey work is required to discover the limits of its distribution. Conservation issues are similar to those described for the Kianyaga Valleys (IBA 3): the babblers depend on small thickets of the exotic *Lantana camara* for shelter and nest sites, and fewer and fewer refuges are available as the human population grows and pressure on the land increases. Unlike Kianyaga, birds are not extensively hunted in Mukurweini, but the effect of human disturbance on nesting success (Njoroge & Mutinda 1996) may still be considerable.

One privately-owned bird sanctuary, Wajee Camp (10 ha), already exists, and Hinde's Babbler is a major visitor attraction here.

Further reading

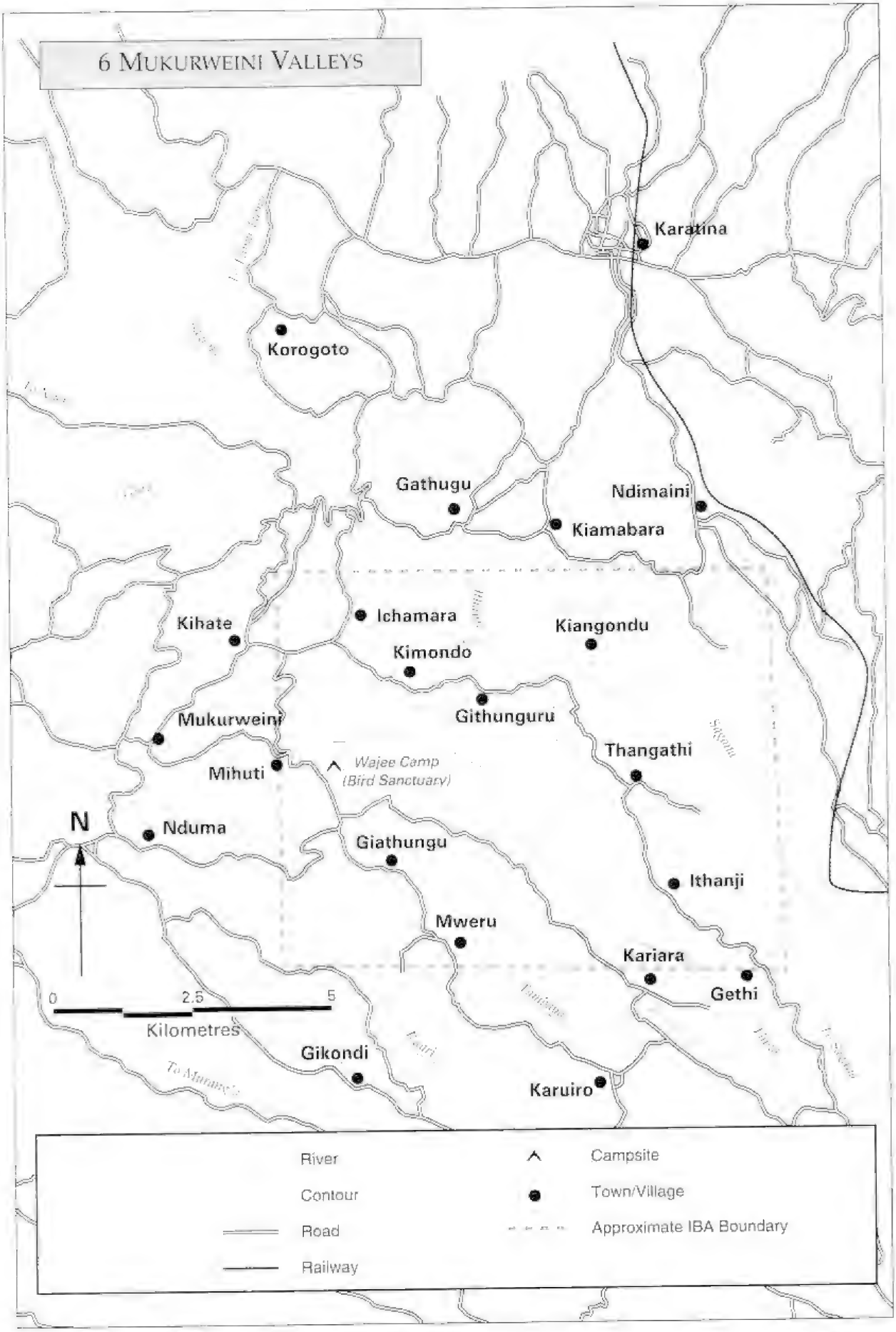
Njoroge 1994, Njoroge & Bennun, in press, Njoroge *et al.*, in press

Cinnamon-chested Bee-eater

Globally-threatened species

*Hinde's Babbler	Endangered	Groups occur in many of the river valleys (mean group sizes 3.8 birds, mean densities 3.1 birds/km^2: Njoroge & Bennun, in press)

**also restricted-range species*


6 MUKURWEINI VALLEYS
Karatina
Korogoto
Gathugu
Ndimaini
Kiamabara
Kihate
Ichamara
Kiangondu
Kimondo
Githunguru
Mukurweini
Thangathi
Wajee Camp
(Bird Sanctuary)
Mihuti
N
Nduma
Giathungu
Ithanji
Mweru
Kariara
Gethi
0
2.5
5
Kilometres
Gikondi
Karuiro
River
Contour
Road
Railway
Campsite
Town/Village
Approximate IBA Boundary

7 Arabuko–Sokoke Forest

3°20'S, 39°55'E, Coast Province, Kilifi and Malindi Districts

41,600 ha (c. 38,200 ha indigenous forest or thicket)

Altitude: 0–210 m

Status: Forest Reserve

Categories: Globally-threatened species, restricted-range species, East African Coast biome species

Site description

Arabuko–Sokoke lies a few kilometres inland on the Kenyan coast, between the towns of Kilifi and Malindi and some 110 km north of Mombasa. It is the largest extant fragment of the forests that once covered much of the East African coast, and whose remnants constitute the East African Coastal Forests Endemic Bird Area. Arabuko–Sokoke was proclaimed a Crown Forest in 1932 and gazetted in 1943, covering an area of 39,100 ha. The Kararacha extension (2,700 ha) to the south-east, which includes important tracts of key habitats, was added in 1968. Part of the forest, containing sections of the three main habitat types, was gazetted as a strict nature reserve (covering 4,300 ha) in the late 1960s. Average annual rainfall ranges from 900 mm (in the relatively dry and scrubby north-west) to 1,100 mm (in the east). The relatively flat eastern section lies on Pleistocene lagoonal sands and clays, separated by a wide band of apparently riverine sandy deposits from the ridge of red Magarini sands that forms the western part of the Reserve (Robertson & Luke 1993). Three very distinctive forest types, each with its own special flora and fauna, correspond to these soil types:

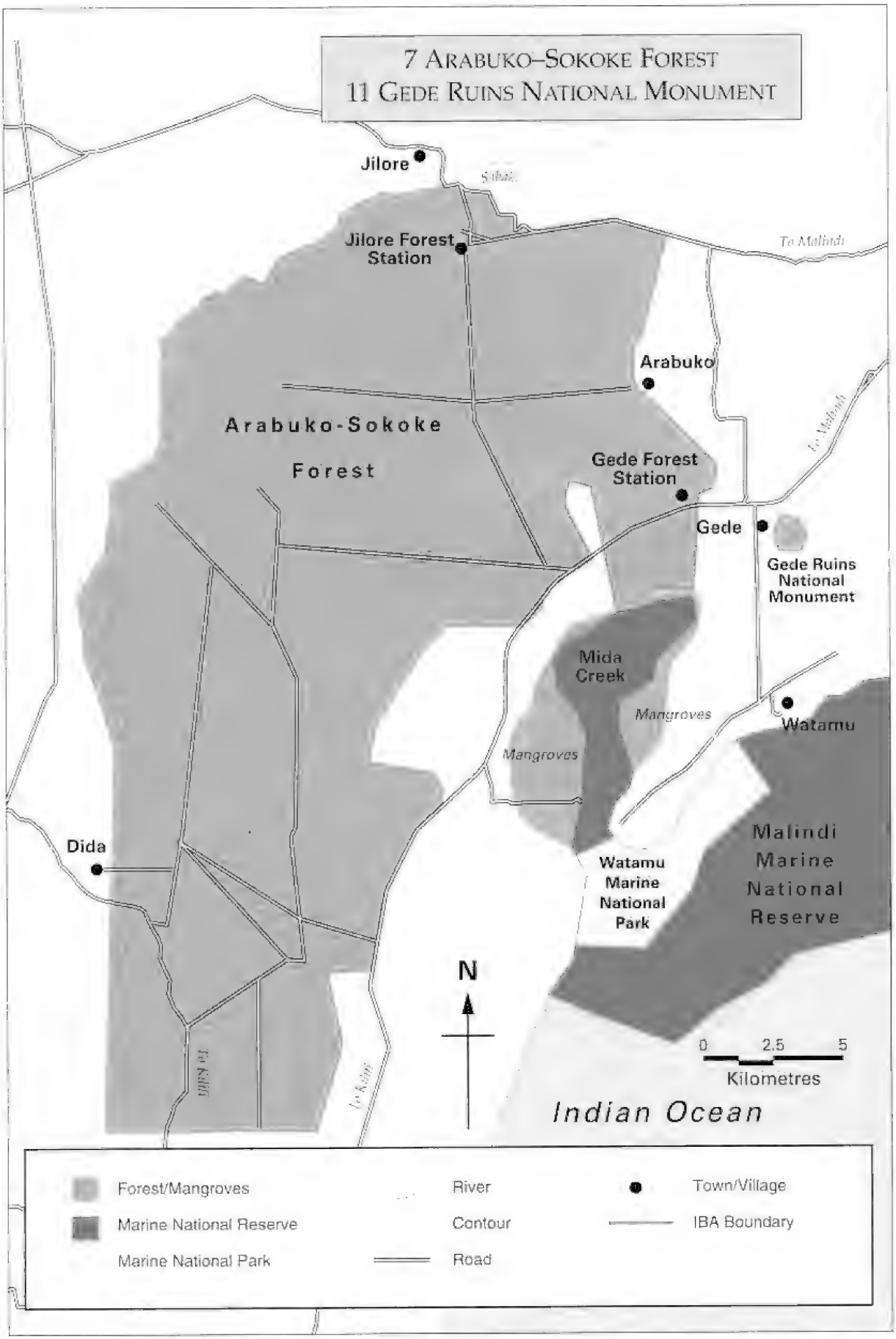
1. Mixed forest (7,000 ha) in the east, on grey sands. This habitat is relatively dense, tall and undifferentiated, with a diversity of tree species. Characteristic trees include *Combretum schumannii*, *Drypetes reticulata*, *Afzelia quanzensis*, *Dialium orientale*, *Hymenaea verrucosa* and *Manilkara sansibarensis*.
2. *Brachystegia* woodland (7,700 ha) runs in a strip through the approximate centre of the forest, on white, very infertile soil. This relatively open habitat is dominated by *Brachystegia spiciformis*.
3. In the west, on red Magarini sands, is *Cynometra* forest and thicket, dominated by *Cynometra webberi* with *Manilkara sulcata*, *Oldfieldia somalensis* and (formerly) *Brachylaena huillensis*. (This last tree, much in demand for the carving trade, has been almost logged out from much of the forest.) The transition between white and red soil is sudden, and marked by a chain of seasonal ponds. There are two areas of relatively tall *Cynometra* forest, with a canopy height of up to 20 m, in the north (3,300 ha) and the south (6,600 ha) of this zone. Between these is a lower, scrubbier formation of intermediate *Cynometra* (11,300 ha) with a canopy height of 7–8 m. The dry north-western part of the Reserve is covered by a low, dense, and often almost impenetrable *Cynometra* thicket (2,300 ha), with the canopy no more than 3 m high.

Birds

See box and Appendix 3 for key species. Arabuko-Sokoke has been ranked by BirdLife International as the second most important forest for bird conservation in mainland Africa (Collar & Stuart 1988). Six globally-threatened species, and five out of the seven species in the East African Coastal Forests Endemic Bird Area, occur. Clarke's Weaver is known only from Arabuko–Sokoke and the little-studied Dakatcha woodland (IBA 9), while the Sokoke Scops Owl is only known from this forest and one other site in north-east Tanzania. More than 230 bird species are recorded (Fanshawe 1995), including 25 of Kenya's 30 African East Coast biome species (24 regularly). As well as the species listed in the box, Great Egret, White-backed Duck and African Finfoot, all regionally threatened, have been recorded occasionally on forest pools.

Other wildlife

Arabuko–Sokoke is rich in rare and endemic wildlife, especially among the fauna. Six taxa of butterflies endemic to the East African coast are present, as well as three rare, near-endemic mammals: Golden-rumped Elephant Shrew *Rhynchocyon chrysopygus*, Ader's Duiker *Cephalophus adersi* (found only in Sokoke and Zanzibar) and the distinctive Sokoke Bushy-tailed Mongoose *Bdeogale crassicauda omnivora*. There is also a small population of the African Elephant *Loxodonta africana*, and the African Golden Cat *Felis aurata*, rare in Kenya, may occur (Virani 1993). Unusual reptiles include the Green Keel-bellied Lizard *Gastropholis prasina*, and the forest is exceptionally rich in amphibia, including


7 Arabuko–Sokoke Forest
11 Gede Ruins National Monument
Jilore
Jilore Forest Station
To Malindi
Arabuko
Arabuko-Sokoke Forest
Gede Forest Station
Gede
Gede Ruins National Monument
Mida Creek
Mangroves
Mangroves
Watamu
Dida
Watamu Marine National Park
Malindi Marine National Reserve
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0 2.5 5
Kilometres
Indian Ocean
Forest/Mangroves
Marine National Reserve
Marine National Park
River
Contour
Road
Town/Village
IBA Boundary

Globally-threatened species		
Southern Banded Snake Eagle	Near-threatened	Resident
*Fischer's Turaco	Near-threatened	Common in the taller forest
*Sokoke Scops Owl	Endangered	Confined to *Cynometra* forest and (at much lower densities) intermediate *Cynometra*. Arabuko–Sokoke holds by far the bulk of the world's population, with an estimated 850–1,200 pairs (Britton & Zimmerman 1979, Virani, in press)
Spotted Ground Thrush	Endangered	Regular intra-African migrant, March–October (Mann 1976, Britton & Zimmerman 1979)
*Sokoke Pipit	Vulnerable	Uncommon resident of the ground stratum (Lewis & Pomeroy 1989, Fanshawe 1993)
East Coast Akalat	Vulnerable	Arabuko–Sokoke may hold the world's largest population. As many as 9,000 pairs may be present, mainly in the *Cynometra* forest (Britton & Zimmerman 1979, Matiku *et al.*, in press)
*Amani Sunbird	Vulnerable	Very local, principally in *Brachystegia* woodland (Turner 1977, Britton & Zimmerman 1979, Fanshawe 1995, *in litt.*)
Plain-backed Sunbird	Near-threatened	Relatively common, especially in mixed forest
*Clarke's Weaver	Vulnerable	Mainly in *Brachystegia* woodland. An enigmatic species whose numbers fluctuate (Mann 1976, Britton & Zimmerman 1979, Taylor 1984) and whose nest is unknown

** also restricted-range species*

Regionally-threatened species		
Ayres's Hawk Eagle	Vulnerable	Scarce resident
African Crowned Eagle	Vulnerable	Resident
African Pitta	Vulnerable	Scarce non-breeding visitor, few recent records
Scaly Babbler	Vulnerable	Local and rarely recorded
Little Yellow Flycatcher	Vulnerable	Mainly in mixed forest, avoids disturbed areas (Fanshawe 1993)

coastal endemics such as Bunty's Dwarf Toad *Mertensophryne micranotis* (Drewes 1997). Robertson & Luke (1993) list 50 plant taxa from Arabuko–Sokoke that are globally or nationally rare.

Conservation issues

Arabuko–Sokoke is rich in biodiversity, but of particular importance is the exceptionally high degree of endemism. This, together with the forest's large area of continuous woody vegetation (most remaining coastal forests cover only a few hundreds of hectares, sometimes much less) gives it a very high conservation value. The forest is managed jointly by the Forest Department and the Kenya Wildlife Service under a Memorandum of Agreement, through the Arabuko–Sokoke Forest Management Team (ASFMT) that brings together these two institutions with the Kenya Forestry Research Institute and the National Museums of Kenya. Extensive licensed logging has occurred in the past, with noticeable negative effects on bird communities in the degraded areas (Fanshawe 1995). Licensed selective logging continues on a smaller scale, along with licensed collection of dead wood for fuel. Both these practices have proven difficult to police, and regular poaching of valuable trees continues to be a major problem. *Brachylaena huillensis*, which is preferred for the carving industry and construction, has been severely affected, as have timber species such as *Pleurostylia africana*. Illegal hunting, mainly of duiker and elephant shrews, is prevalent (FitzGibbon *et al.* 1995, Kanga 1996), although its impacts are somewhat unclear. Local people use forest products for many purposes, including fuelwood and medicinal plants, and collect water at the seasonal pools (Fanshawe 1992).

The forest is surrounded by agriculture on all sides. The Mahaji settlement was excised from the eastern edge of the forest after Independence, and pressure remains high from some quarters for de-gazettement and settlement of the south-eastern Kararacha–Mpendakula section – despite the fact that the soils there are extremely infertile and quite unsuitable for agriculture. More profitable and sustainable uses are possible, including eco-tourism, which is already growing in scale, and butterfly farming. These activities are being promoted by ASFMT through a European Union-funded Arabuko–Sokoke Forest Management & Conservation Project, implemented by the Forest Department, Kenya Wildlife Service and BirdLife International, and by the work of the Kipepeo butterfly farming initiative of the National Museums and East Africa Natural History Society. The latter assists people living close to the forest to produce butterfly pupae, using leaves from forest trees, for export to Europe and America. Funding from the EU is currently available until December 2000.

Further reading

Britton & Zimmerman 1979, Kesley & Langton 1984, Mogaka 1991, Bennun & Waiyaki 1992d, Blackett 1994b, Virani 1994, 1995, Wass 1994, Bennun 1995, Fanshawe 1994, 1995, FitzGibbon *et al.* 1995, Gordon & Depew 1995, Matiku *et al.* in press

Amani Sunbird

8 Dakatcha Woodland

03°01'S, 39°51'E, Coast Province, Malindi District

c. 32,000 ha

Altitude: 90–230 m

Status: Unprotected, unadjudicated Government land and private land

Categories: Globally-threatened species, restricted-range species

Site description

Dakatcha is an extensive tract of relatively intact coastal woodland in coastal Kenya, north of the Sabaki River and between 25 and 50 km inland from the coast. The vegetation is similar to that on the western boundary of Arabuko–Sokoke Forest (IBA 7) (A. Robertson, *in litt.*). The landscape is gently undulating, with woodland dominated by *Brachystegia spiciformis* in the valleys and on the slopes, and *Brachylaena huillensis/Cynometra webberi* associations on top of the low hills, on red Magarini sands. Much of the useful *Brachylaena* has already been cut, since it is in great demand as a long-burning, smokeless fuelwood and as carving timber. There has also been extensive clearing of the hilltops for cultivating pineapples, which do well in this soil type.

The IBA covers two tracts of woodland that nearly adjoin each other, one of around 23,000 ha, north-west of Baricho town, up to and beyond the Galana Ranch boundary to the base of Dakabuko Hill (A. Robertson, *in litt.*), and another of 7,000 ha, north and west of Marafa town. These (along with another tract, Adu, covering 15,000 ha north and west of Adu village some 22 km north of Marafa), have been proposed for gazettement as Forest Reserves in the Kilifi District Forestry Master Plan (Forest Department 1992). Galana Ranch is the property of the Agricultural Development Corporation.

Birds

See box for key species. Dakatcha appears to hold substantial populations of the globally-threatened Sokoke Pipit and Clarke's Weaver (T. Butynksi, unpubl. data). Both these species possibly breed here (the breeding grounds of Clarke's Weaver are undiscovered), and this is the only site outside Arabuko–Sokoke Forest (IBA 7) where Clarke's Weaver is known to occur. The remainder of the avifauna is as yet incompletely known, but is typical of the northern East African coastal forests (Mlingwa *et al.* in press). Eight out of Kenya's 30 East African Coast biome species are so far recorded, and more will certainly be found with further surveys.

Other wildlife

There is no information on other fauna. The threatened Golden-rumped Elephant Shrew *Rhynchocyon chrysopygus* is likely to occur. At least 11 plant taxa in this area are globally or nationally rare, including *Monadenium invenustum*, *Pavetta linearifolia* and *Eulophia serrata* (Robertson & Luke 1993).

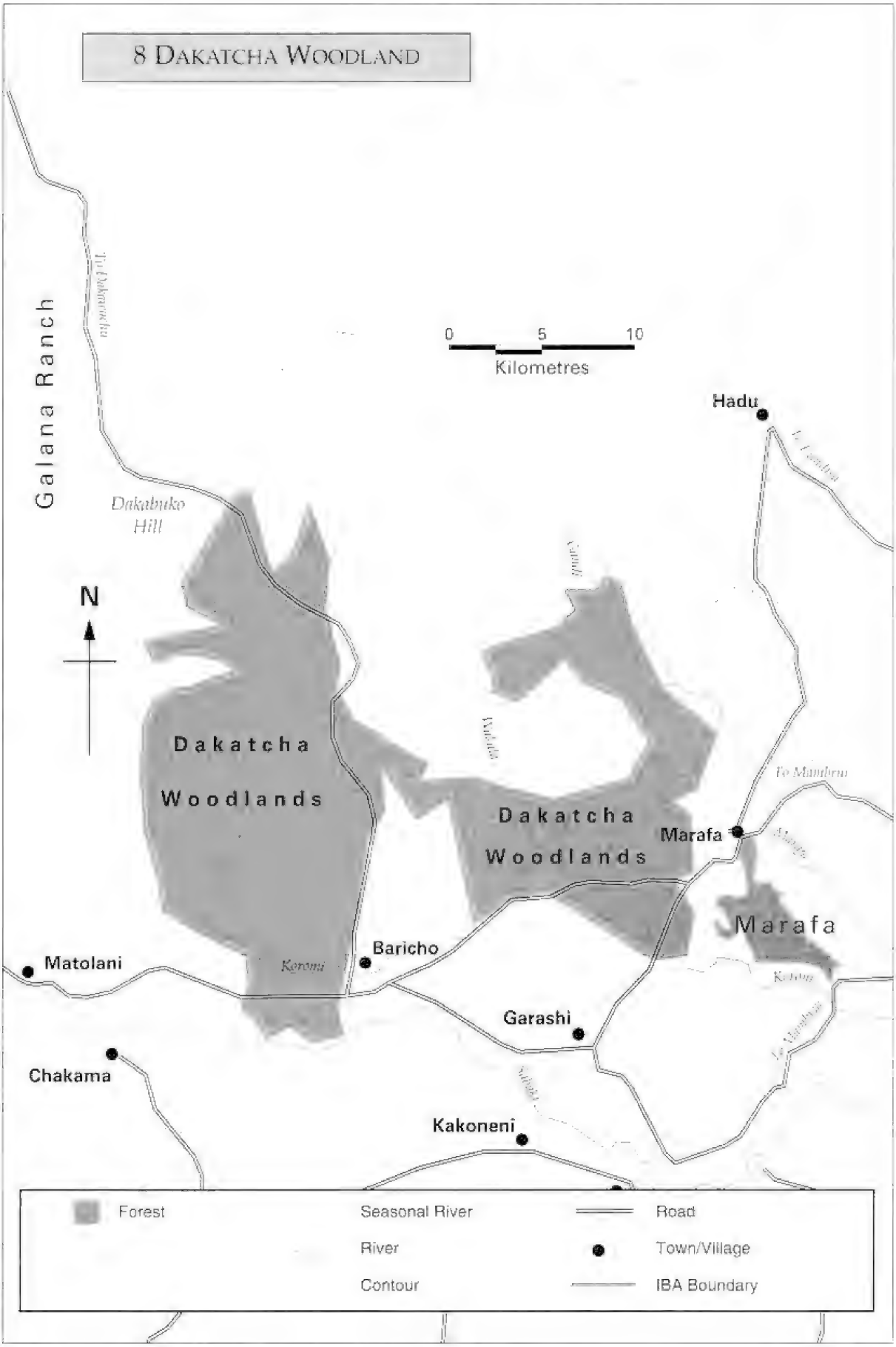
Conservation issues

Despite its importance as one of the last patches of relatively intact coastal woodland, Dakatcha has no formal protected status. It has already suffered some damage from uncontrolled logging and clearing, especially within the hilltop *Cynometra-Brachylaena* forest. In the ongoing adjudication of land in the

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Probably resident
Fischer's Turaco	Near-threatened	Probably resident
*Sokoke Pipit	Vulnerable	Status uncertain, probably a sizeable resident population
*Clarke's Weaver	Vulnerable	Status uncertain; may nest here

**also restricted-range species*


8 DAKATCHA WOODLAND
Galana Ranch
Dakabuko Hill
N
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Kilometres
Hadu
Dakatcha Woodlands
Dakatcha Woodlands
Marafa
Marafa
Matolani
Baricho
Garashi
Chakama
Kakoneni
Forest
Seasonal River
River
Contour
Road
Town/Village
IBA Boundary

Clarke's Weaver

former Kilifi (now Malindi) District, this area should be gazetted as a Forest Reserve to protect its outstanding biological diversity, and allow sustainable use of its timber and other forest products. As Robertson & Luke (1993) point out, this would be a far better use of the woodland than the present land use by nominal or proposed group ranches. Without such protection, the woodland will continue to be degraded and eventually disappear. So far, insecurity has made the area inhospitable to settlers.

When the proposed Dakatcha and Marafa reserves are gazetted, this should ideally be as one single forest, with a connecting corridor at least 1 km wide. If this corridor is not presently wooded, it can be allowed to regenerate gradually to a natural state. By permitting dispersal of birds and other animals between the blocks, a single site will be of considerably more conservation value than two separate ones.

Further reading

Forest Department 1992, Robertson & Luke 1993

9 Diani Forest

04°19'S, 39°33'E, Coast Province, Kwale District *(see map in site account 20)*

c. 80 ha

Altitude: 5–20 m

Status: Private land and (part) National Monument

Category: Globally-threatened species

Site description

This site consists of remnant deciduous coral rag forest (dominated by *Combretum schumannii*) along a 12 km strip of Diani Beach, near Ukunda on the south Kenya coast. The formerly continuous forest has been cleared and fragmented, so that a set of small patches, in various degrees of intactness, now remains. Kaya Ukunda (a National Monument gazetted in 1992), has been left isolated as a 20 ha fragment slightly inland from the others, behind the Two Fishes Hotel. Twenty-one hotels, among other developments, occupy the Diani strip, and a busy road runs through the centre of some of the forest patches (Kahumbu & Eley 1997). (Note that Kaya Diani itself, which lies between Mworoni and Leisure Lodge Hotel, is not within this IBA.)

Birds

See box for key species. The Spotted Ground Thrush, a globally-threatened intra-African migrant, was seen regularly here in the 1980s and is likely still to occur, but there are no recent records. At least 44 other forest-dependent species are recorded, most of them characteristic of East African coastal forests. Birds of regional concern (Bennun & Njoroge 1996) include Mombasa Woodpecker, Tiny and Fischer's Greenbuls and Little Yellow Flycatcher.

Other wildlife

Diani was originally 'one of the most diverse areas of forest along the Kenya coast with a rich coral rag flora' (Robertson & Luke 1993). The threatened Black-and-rufous Elephant Shrew *Rhynchocyon petersi* occurs, but its current status is unknown. Diani has an unusually high density of the Angolan Colobus *Colobus angolensis*, and is an important site for the restricted sub-species *palliatus* (Kahumbu & Eley 1997).

Conservation issues

Diani is a sad example of the destructive effects of uncontrolled tourist development. Only small forest

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Status unknown
*Fischer's Turaco	Near-threatened	Status unknown
Spotted Ground Thrush	Endangered	Formerly regular (e.g. Irvine & Irvine 1977a, 1988, 1991); Diani may still be an important 'stepping stone' forest for this migrant species
Plain-backed Sunbird	Near-threatened	Status unknown

**also restricted-range species*

Regionally-threatened species

African Crowned Eagle	Vulnerable	Status unknown
African Pitta	Vulnerable	An intra-African migrant; no recent records
Little Yellow Flycatcher	Vulnerable	Status unknown
Uluguru Violet-backed Sunbird	Vulnerable	Status unknown

patches are now left, and rampant cutting of *Combretum schumannii* for tourist carvings has degraded much of what remains. Apart from the isolated Kaya Ukunda, the forest remnants are now contained on private land. Though many owners have destroyed their forest or permitted it to be degraded, others (notably the hotels Robinson Club Baobab and Nomads) have protected their holdings. The remaining forest, although fragmented, is still very valuable for biodiversity conservation. Recently, road kills of colobus have focused local attention on the plight of this species and the forest as a whole, resulting in the registration of a local environmental group: Wakuluzu, Friends of the Colobus Trust.

Wakuluzu's concern covers Diani in particular and other South Coast forests with colobus in general. At Diani, work to restore the habitat and the connections between forest patches is urgently needed. Local recognition of the value of the forests, for tourism as well as for biodiversity conservation, may help to bring this about.

Further reading

Irvine & Irvine 1970, 1977a,b, 1988, 1991, Ng'weno 1980, Robertson & Luke 1993, Kahumbu & Eley 1997, Mlingwa *et al.* in press, Waiyaki & Bennun, *in press*

Little Yellow Flycatcher

10 Dzombo Hill Forest

04°26'S, 39°12'E, Coast Province, Kwale District *(see map in site account 17)*

295 ha

Altitude: 100–470 m

Status: Forest Reserve and National Monument

Categories: Globally-threatened species, restricted-range species

Site description

Dzombo Hill, like Mrima (IBA 18), is an igneous intrusion into the Triassic sandstones of the surrounding coastal plain. The hill rises abruptly to around 470 m, with a lower summit at 400 m to the west. The rainfall is 900–1,100 mm per year, with considerable additional mist and dew on the upper slopes. Dzombo is covered by undifferentiated coastal mixed forest, wettest on the south-eastern slopes. To the north and north-west, the forest grades into drier woodland and scrub.

Pale Batis

Large trees include *Combretum schumannii, Lannea welwitschii, Cola clavata, Ricinodendron heudelotii, Scorodophloeus fischeri, Tamarindus indica, Newtonia paucijuga, Sorindeia madagascariensis, Diospyros mespiliformis* and *Manilkara discolor* (Robertson & Luke 1993). Dzombo was gazetted as a Forest Reserve in 1941, and Kaya Dzombo as a National Monument, within the Forest Reserve, in 1992. The forest is considered sacred by the local community, with the grave of a Digo ruler, or Kubo, near the summit.

Birds

See box for key species. The globally-threatened and restricted-range Sokoke Pipit has recently been discovered here. Dzombo has a rich avifauna, with

Globally-threatened species

*Sokoke Pipit	Vulnerable	Recent records; presumably resident (Waiyaki 1995)
Plain-backed Sunbird	Near-threatened	Probably fairly abundant
*Fischer's Turaco	Near-threatened	Probably fairly abundant

**also restricted-range species*

Regionally-threatened species

African Crowned Eagle	Vulnerable	Status unknown

35 forest-dependent species recorded; more are likely to be listed with further surveys.

Other wildlife

The threatened Black-and-rufous Elephant Shrew *Rhynchocyon petersi* occurs; it is restricted to a small number of East African coastal forests. Dzombo holds a number of rare plants, with 36 taxa listed as rare globally in Kenya, including the endemic *Ziziphus robertsoniana* and an undescribed species of *Uvariodendron* (Robertson & Luke 1993, Q. Luke, *in litt.*).

Conservation issues

Dzombo is designated as a national monument and considered sacred by the local community. This affords it some protection. However, it is increasingly under threat from agricultural encroachment (which is already considerable), unsustainable timber and pole extraction, bark stripping of trees for binding materials and firewood collection (Waiyaki & Bennun, in press). At present, vehicle access into the forest is difficult and Forest Department control is minimal. The steep topography of this site probably discourages commercial loggers from exploiting it, although there has been heavy poaching of *Combretum* on the lower slopes for splitting into building poles. In the longer term, encroachment is likely to become the most serious threat as the demand for land increases. In the past, fire has been used to open up this site for easy clearing for agriculture; frequent fires on the south-western slopes have turned forest into grassland.

Further reading

Mungai 1985, Robertson & Luke 1993, Mlingwa *et al.*, in press, Waiyaki & Bennun, in press

Mombasa Woodpecker

11 Gede Ruins National Monument

03°18'S, 40°01'E, Coast Province, Malindi District *(see map in site account 7)*

44 ha (c. 35 ha forest)

Altitude: 15 m

Status: National Monument

Category: Globally-threatened species

Site description

Gede lies some 94 km north of Mombasa on the Mombasa-Malindi road. A gazetted National Monument since 1927, now managed by the National Museums of Kenya, it protects the excavated ruins of an old Arab-African town, that was abandoned in the 17th century. Over the ruins, on the shallow coral rag soil, has grown a lowland semi-deciduous forest, maintained by rainfall of around 1,100 mm per year. The 44 ha site, surrounded by farmland, is entirely fenced, and contains around 35 ha of coastal forest, traversed by narrow paths that wind between the excavated buildings. At least 50 indigenous tree species occur, including *Gyrocarpus americanus* and *Sterculia appendiculata* (Gerhardt & Steiner 1986). The edge of Arabuko-Sokoke Forest is about 3 km away to the west.

Birds

See box for key species. Despite its small size, Gede is an important site for the globally-threatened Spotted Ground Thrush, a non-breeding visitor. As many as 110 birds may be present between March and October each year (Bennun 1985). The globally-threatened and restricted-range Sokoke Pipit has also been recorded here, though there are no recent records and the population, if still extant, must be tiny. Densities of most other birds are also low, although the listed avifauna is surprisingly diverse – 42 forest-dependent species have been recorded (Mlingwa *et al.*, in press), including 12 of Kenya's 30 East African Coast biome species and the restricted-range Fischer's Turaco, which is resident. Gede is not listed under the biome category, since many of these species may only be occasional visitors. Palm-nut Vultures regularly nest in the tall trees within the main excavation.

Spotted Ground Thrush

Other wildlife

The Golden-rumped Elephant Shrew *Rhynchocyon chrysopygus*, endemic to the northern East African coast, occurs here, formerly at high densities (FitzGibbon 1994). The plant *Phaulopsis gediensis* has recently been described from this site (Robertson & Luke 1993).

Conservation issues

This is one of the few examples of semi-deciduous forest on coral rag — a distinctive and threatened forest type — that is formally protected in Kenya. The ruined walls and buildings, overgrown with beautiful forest trees, are extremely attractive, and Gede is a popular destination with tourists at the coast. Forty thousand visitors came here in 1989, though there has been a slight drop-off in the 1990s. The forest is now completely surrounded by farmed land, but up until around the early 1980s there were corridors to other forest patches in the Malindi-Watamu area (A. Robertson, *in litt.*) Small trees and undergrowth along some trails have been extensively cleared since 1990, which has made the habitat less suitable for the Spotted Ground Thrush; however, overall numbers of this species changed little between 1983 and 1992 (E. Waiyaki & L. Bennun, unpubl. data).

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Status unknown
*Fischer's Turaco	Near-threatened	Fairly common
Spotted Ground Thrush	Endangered	A regular non-breeding visitor, at relatively high densities (Bennun 1985, 1987 & 1992c)
*Sokoke Pipit	Vulnerable	No recent records; may have been an occasional visitor in the past
Plain-backed Sunbird	Near-threatened	Fairly common

**also restricted-range species*

Regionally-threatened species

African Pitta	Vulnerable	Non-breeding visitor (Rathbun 1978); no recent records
Scaly Babbler	Vulnerable	Status unknown
Little Yellow Flycatcher	Vulnerable	No recent records; may have been an occasional visitor in the past

Local use and disturbance of the forest, formerly a problem, has been controlled by fencing. A pack of guard-dogs now roams the site at night, but unfortunately they have eaten their way through most, and perhaps all, of the Golden-rumped Elephant Shrew population (FitzGibbon 1994). The Kipepeo project, which encourages butterfly farming among local communities around Arabuko–Sokoke Forest, is based at Gede, where there are butterfly flight and display cages. A 5 ha section of degraded land to the west of the main excavations is now being restored and growing up as forest, through the Gede National Monument Forest Restoration Project (originally the Gede Koningschool Forest Project: Robertson 1994, Robertson & Ngonyo 1998).

Further reading

Faden & Faden 1972, Kirkman 1975, Rathbun 1979a,b, Bennun 1985, 1987, Gerhardt & Steiner 1986, Nicoll & Rathbun 1990, Robertson & Luke 1993, FitzGibbon 1994, Fanshawe 1994

12 KAYA GANDINI

04°01'S, 39°30'E, Coast Province, Kwale District *(see map in site account 20)*

150 ha

Altitude: 140–200 m

Status: National Monument

Categories: Globally-threatened species, restricted-range species

Sokoke Pipit

Site description

The Kayas are small, relict patches of forest that once sheltered the fortified villages of the Mijikenda people on the Kenyan coast. They have spiritual and ceremonial significance and are customarily protected by a Council of Elders. Kaya Gandini (also known as Takawa or Duruma, and sacred to the Duruma people) lies around 15 km east-north-east of Mombasa, near the town of Gandini, and overlooking the Mambome River. It is dry deciduous *Cynometra–Terminalia* forest. Kaya Mtswakara (247 ha), which is similar floristically, is situated around 2 km away across the Mambome river, and is in turn adjacent to Mwache Forest Reserve (c. 345 ha), which is somewhat wetter forest across the Mwache River. The Kaya was gazetted as a National Monument under the care of the National Museums of Kenya in 1992.

Birds

See box for key species. This is a potentially important site for the threatened Spotted Ground Thrush and the threatened and restricted-range Sokoke Pipit. The avifauna is not well studied but is typical of East African coastal forests. Species of regional concern (Bennun & Njoroge 1996) include Fischer's Turaco, Thick-billed Cuckoo, Eastern Green Tinkerbird, Mombasa Woodpecker, Chestnut-fronted Helmet-shrike and Plain-backed Sunbird.

Conservation issues

As in other Kayas, an increasing disregard for traditional values has led to conservation problems in Gandini. The Kaya has recently been the subject of a land dispute, where certain elders marked out and cut parts of the forest for farming. They have now been requested to move out by the Council of Elders (Q. Luke, *in litt.*). There has been some cutting of building poles, especially *Terminalia*, but on the whole the forest is in fairly good condition. Gandini is relatively accessible from a main road, making it potentially attractive for timber extraction. However, these threats seem to be under control at present, and (with the support of the National Museums' Coast Forest Conservation Unit) the elders are taking a more active role in managing use of the forest. Trapping of animals (possibly unsustainable) and collection of fuelwood and poles (possibly sustainable) continue.

Kaya Mtswakara (gazetted as a National Monument in 1997) is separated from Gandini by

Globally-threatened species

*Fischer's Turaco	Near-threatened	
Spotted Ground Thrush	Endangered	Non-breeding visitor, March to October (Waiyaki & Bennun, in press)
*Sokoke Pipit	Vulnerable	Recent records, presumably resident in small numbers (Waiyaki & Bennun, in press)
Plain-backed Sunbird	Near-threatened	

**also restricted-range species*

around 2 km of settled land along the Mambome River. Restoring a strip of natural vegetation along the river would form a dispersal corridor for birds and other animals. Surveys showed Mtswakara's avifauna to be similar to Gandini's but less diverse, and apparently lacking the two threatened species (Waiyaki 1995). Mwache Forest Reserve has not yet been surveyed for birds. It could form a third part of a single conservation area; it has panoramic views of the coast from its ridgetops, and could be opened up for recreational tourism (Robertson & Luke 1993). Additional surveys are needed to determine whether the threatened birds do occur in Mtswakara and Mwache, in which case the sites should be considered together as a single IBA. Mtswakara is well conserved at present and local control over forest use appears to be effective, but there is considerable illegal pressure on poles and fuelwood in Mwache.

Further reading

Robertson & Luke 1993, Mlingwa *et al.*, in press, Waiyaki & Bennun, in press

13 Kaya Waa

04°11'S, 39°36'E, Coast Province, Kwale District *(see map in site account 20)*

20 ha

Altitude: 15 m

Status: National Monument

Category: Globally-threatened species

Site description

The Kayas are small, relict patches of forest that once sheltered the fortified villages of the Mijikenda people on the Kenyan coast. They have spiritual and ceremonial significance and are customarily protected by a Council of Elders. Kaya Waa (sacred to the Digo people) is *Cynometra-Drypetes* forest on coral rag that covers a level cliff-top just above the ocean, near Waa village. The forest is dense and low, practically a thicket in many places, and difficult to walk through. Under the coral cliffs there is reportedly a large cave, which is of religious significance to the local people. The site was gazetted as a National Monument under the care of the National Museums of Kenya in 1992.

Birds

See box for key species. The habitat structure is very suitable for the threatened Spotted Ground Thrush (cf. Bennun 1987), which has been recorded here and is likely to occur at relatively high density. The remaining avifauna is impoverished, but Fischer's Turaco (near-threatened and restricted-range) and Eastern Green Tinkerbird (East African coast biome) have also been recorded.

Other wildlife

The threatened Black-and-rufous Elephant Shrew *Rhynchocyon petersi* probably occurs. There is a healthy population of the coastal forest tree *Cynometra greenwayi*, a rare Kenya endemic known only from here and the Watamu area (Robertson & Luke 1993, Q. Luke *in litt.*).

Conservation issues

The main threat to this sea-front Kaya is of the land being 'allocated' to private developers. This Kaya was the centre of a land allocation controversy in 1988, which led, eventually, to a successful Private Member's Motion in Parliament to gazette the Kayas as National Monuments (Robertson & Luke 1993). Twenty hectares of Kaya Waa was gazetted in 1992, but the forest remains divided into some 57 plots, for which title deeds have apparently been issued, and its fate is uncertain.

Pole-cutting for the hotel industry (to build traditional-style Mijikenda huts) has caused considerable damage, and many larger trees have also been removed, often for bee-hives. Continued degradation will greatly reduce the value of the site

Fischer's Turaco

Globally-threatened species

Spotted Ground Thrush	Endangered	Recorded during survey work in 1994 (Waiyaki 1995). The habitat appears to fit this species' requirements very well, with dense shade, thick leaf litter and an open understorey interspersed with tangles of vegetation (Bennun 1987)
*Fischer's Turaco	Near-threatened	Status unknown

**also restricted-range species*

for the Spotted Ground Thrush, which avoids areas with an open canopy. Fires deliberately set to clear the surrounding agricultural land also pose a threat to the forest. Hunting pressure appears to be very high, with numerous traps and snares, apparently exacerbated by the settlement of Tharaka immigrants in the area some 15 years ago (Waiyaki & Bennun, in press).

Further reading

Robertson & Luke 1993, Waiyaki 1994, Mlingwa *et al.* in press, Waiyaki & Bennun in press

14 Kisite Island

4°43'S, 39°22'E, Coast Province, Kwale District

c. 1 ha at low tide

Altitude: 0–5 m

Status: Protected within the Kisite-Mpunguti Marine National Park

Category: Congregations

Site description

A small, waterless coral island 8 km offshore in the Kisite-Mpunguti Marine National Park. The Park lies south of Wasini Island off Shimoni, on the south Kenyan coast near the Tanzanian border, and covers an area of 1,100 ha. Kisite itself is flat and treeless, covered in low grass and herbs. Coral platforms around the raised central portion are exposed at low tide. There are three other coral islets in the Park (Mpunguti ya Juu, Mpunguti ya Chini and Jiwe la Jahazi), but these lie closer to the larger Wasini Island, are scrub-covered, and support no significant numbers of nesting waterbirds.

Birds

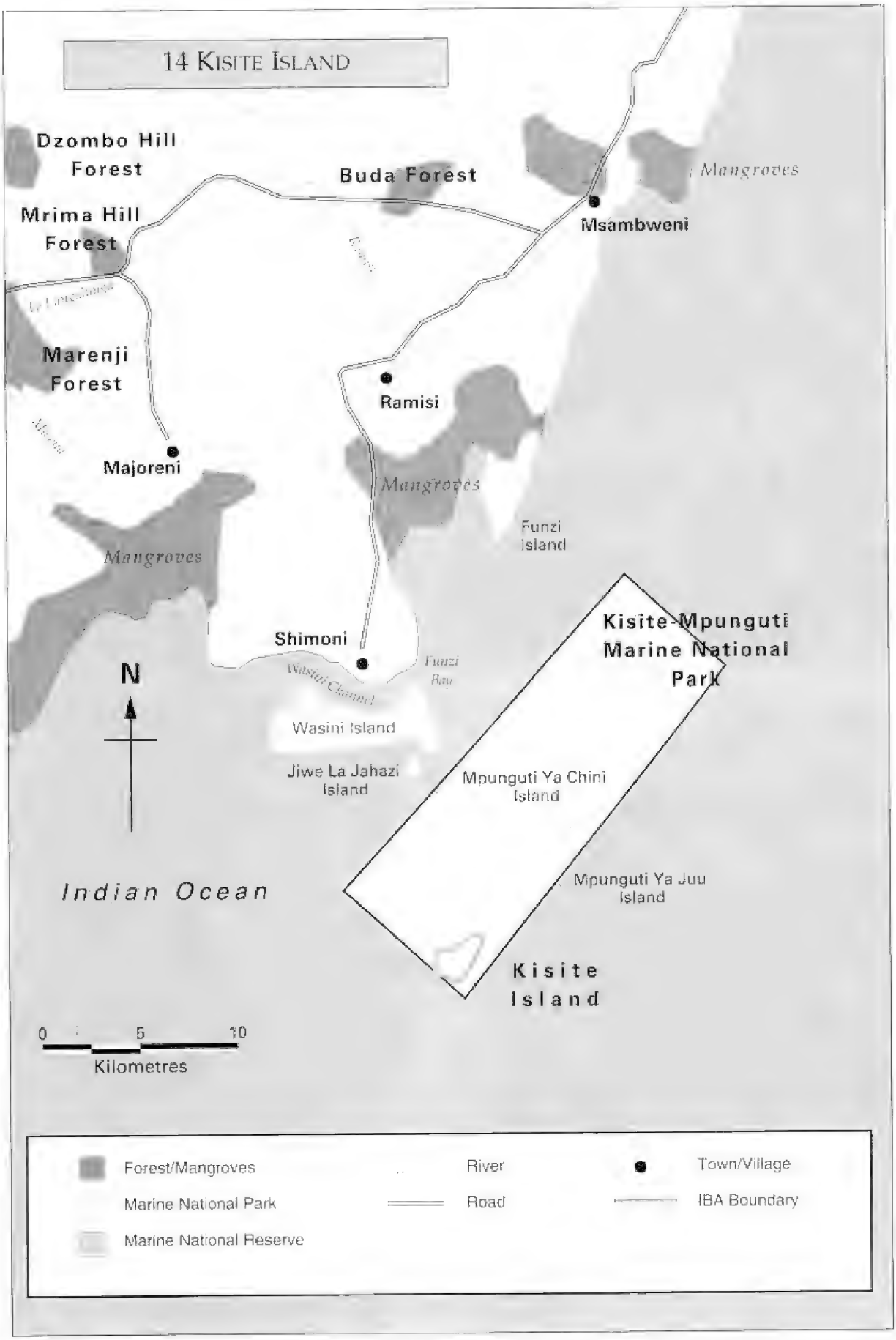
See box for key species. Between July and October, Kisite supports an assemblage of pelagic-feeding birds. In many (but not all) years this includes a

Congregatory species

1% or more of biogeographic population

Roseate Tern (400)	Up to 1,000 pairs (Lewis and Pomeroy 1989) ; 400 adults and c.100 young birds in October 1997 (F. Ng'weno *in litt.*); numbers fluctuate greatly from year to year

Roseate Terns


14 KISITE ISLAND
Dzombo Hill Forest
Buda Forest
Mrima Hill Forest
Msambweni
Mangroves
Marenji Forest
Ramisi
Majoreni
Mangroves
Mangroves
Funzi Island
Kisite-Mpunguti Marine National Park
Shimoni
Wasini Channel
Funzi Bay
N
Wasini Island
Jiwe La Jahazi Island
Mpunguti Ya Chini Island
Indian Ocean
Mpunguti Ya Juu Island
Kisite Island
0 5 10
Kilometres
Forest/Mangroves
Marine National Park
Marine National Reserve
River
Road
Town/Village
IBA Boundary

breeding colony of Roseate Terns in internationally important numbers. Sooty Terns also nest here regularly (50 pairs recorded in 1976: Zimmerman *et al.*, 1996; around 20 in 1997: F. Ng'weno, *in litt.*), along with Dimorphic Egrets (Brass 1994, Zimmerman *et al.* 1996).

Conservation issues

Kisite's relatively remote location and the lack of tall vegetation makes it suitable for nesting seabirds. Seabirds everywhere along the Kenya coast nest during the June–October period, when the south-east monsoon makes for rough seas and prevents human access to their nesting sites. Nonetheless, before the site was protected in 1978, the breeding colonies were frequently disturbed by egg collectors. The colonies now appear to be recovering. The number of tourists visiting Kisite is increasing, and careful management is needed to ensure that they do not disrupt the colonies.

Further reading

Britton & Brown 1974, Britton 1977, IUCN/UNEP 1987, Brass 1994

15 Kiunga Marine National Reserve

1°50'S, 41°26'E, Coast Province, Lamu District

25,000 ha

Altitude: 0–30 m

Status: National Reserve

Category: Congregations

Site description

Kiunga Marine National Reserve (gazetted in 1979) incorporates a chain of about 50 calcareous offshore islands and coral reefs in the Lamu Archipelago, running for some 60 km parallel to the coastline off the northernmost coast of Kenya, north-east of Pate Island. Composed of old, eroded coral, the islands mainly lie around 2 km offshore, and inshore of the fringing reef; they vary in size from a few hundred square metres to 100 ha or more. Their walls rise sheer from the surrounding seabed and are usually deeply undercut on the landward side. The larger islands and the more sheltered inner islands are covered with low, tangled, thorny vegetation, including grass, aloes and creepers. The small outer islands, coral blocks up to 18 m high, provide nest sites for seabirds. They consist of bare, sharp-edged spikes and ridges of coral on the seaward side, with only a little straggling vegetation, such as *Salicornia* and the succulent *Sanseveria*. On the landward side there is more vegetation, including stunted, thorny bushes of *Commiphora* and *Salvadora persica*. The coast itself has sandy beaches, some with mangrove swamps, and mangroves often grow in the shelter of the larger islands. Rainfall is around 500 mm per year. Part of the mainland coastline is protected in the 87,700 ha Dodori National Reserve, gazetted in 1976.

Birds

See box for key species. The small outer islands are rich in seabirds. As well as Roseate Terns in internationally important numbers, species nesting here include Sooty Gull, White-cheeked Tern, Bridled Tern and Brown Noddy (Fogden 1964, Britton & Brown 1971). The seabirds nest from June to September, when rough seas and strong winds make human access to the islands difficult. They do not use the larger or more vegetated islands. Crab-plovers (in internationally important numbers) and other migrant waders frequent the more sheltered flats and creeks, mainly from August to April.

Other wildlife

The reserve conserves valuable coral reefs, sea grass meadows and extensive mangrove forests, with their attendant biodiversity. Three species of turtles, *Chelonia mydas*, *Eretmochelys imbricata* and *Lepidochelys olivacea*, nest on the beaches.

Conservation issues

The human population around the reserve is low, and the poor security situation in recent years means that few people live permanently in the area. This, combined with difficult access, has also limited the development of eco-tourism. Local fishermen traditionally collect seabirds' eggs when they can,

Crab-plover

15 KIUNGA MARINE NATIONAL RESERVE

Congregatory Species

1% of biogeographic population

Crab-plover (300)	800+, November 1996 (southern end of Kiwayuu Island: Nasirwa *et al.* 1998.)
Roseate Tern (400)	1,195 pairs on islets near Kiunga, 1961 (Fogden, 1964). 5,000+ pairs, Mlango wa Hindi, August 1970 (Britton & Brown, 1971)

usually taking the entire contents of a colony (Fogden 1964). The sheer, underhung walls of the islets and the rough seas during the south-east monsoon make access difficult, so egg collection is probably infrequent. Predation of Roseate Tern eggs by Sooty Gulls, and by the storks, ibises and herons that roost on the islets at high tide and at night, may have a substantial impact even without human disturbance (Fogden 1964).

There is some low-volume, high-cost tourism in the Reserve. The luxurious Kiwayu Safari Camp is based at Siesheni on the mainland, and there are several camps on Kiwayuu Island. A number of archaeological sites on the mainland and main islands have great tourist potential (A. Robertson, *in litt.*).

There has been no recent survey of the area during the seabird nesting season, so the current status of the seabird colonies is unclear. Additional work in this little-known site is needed.

Further reading

Fogden 1964, Britton & Brown 1971, 1974, IUCN/UNEP 1987, Nasirwa *et al.* 1998

16 Mida Creek, Whale Island and the Malindi–Watamu Coast

03°20'S, 40°05'E

26,100 ha

Altitude: 0–10 m

Status: Protected National Park and Reserve; mangrove areas also gazetted as Forest Reserves, and coastal area designated as Biosphere Reserve

Category: Congregations

Site description

A complex of marine and tidal habitats on Kenya's north coast, stretching from just south of Malindi town southwards to beyond the entrance to Mida Creek. Habitats include intertidal rock, sand and mud; fringing reefs and coral gardens; beds of sea-grass; coral cliffs, platforms and islets; sandy beaches; and mangrove forests. Mida Creek, a large, almost land-locked expanse of saline water, mangrove (1,600 ha) and intertidal mud (580 ha), is in the southern sector of the IBA near Watamu town and Mida village, and protected by the 3,200 ha Watamu Marine National Reserve (gazetted in 1968). Its extensive mangrove forests are also gazetted as Forest Reserves, and the extreme western tip of Mida Creek is part of the Arabuko–Sokoke Forest Reserve (IBA 7). The remaining part of the IBA, along the open coast, is protected by the Malindi Marine National Reserve (21,300 ha), gazetted in 1976 and designated as a Biosphere Reserve in 1979. Enclosed within the Reserve are the Watamu and Malindi Marine National Parks (1,000 and 600 ha respectively), which afford stricter protection. The IBA includes several coral islets, notably Whale Island at the entrance to Mida Creek in the Watamu Marine National Park.

Birds

See box for key species. Mida Creek is an important passage and wintering area for Palaearctic migrant waders, while the coastline and Whale Island support significant feeding and nesting populations of terns. The populations of Greater and Lesser Sandplover and Crab-plovers at Mida Creek are internationally important, and many other species use the site: up to 6,000 waders may be present at any one time (D. J. Pearson, *in litt.*).

Saunders's Tern

The creek is also a significant feeding area for Western Reef Heron, Lesser Crested Tern and Roseate Tern. Common migrant shorebirds here include Sanderling, Curlew Sandpiper, Whimbrel, Grey Plover and Greater and Lesser Sandplover. Roseate and Bridled Terns nest on Whale Island between June and October in some years. Saunders's Tern occurs in internationally important numbers along the coastline, usually feeding close to shore.

Other wildlife

Mida Creek has important mangrove forests, with a high diversity of species including *Ceriops tagal*, *Rhizophora mucronata*, *Bruguiera gymnorrhiza*, *Avicennia marina* and *Sonneratia alba* (Gang & Agatsiva 1992). It is a key spawning ground for many fish species. The Marine Reserve and National Parks are important for the conservation of the fringing reefs, the famous coral gardens within the lagoons, and the sea grass beds, all with their attendant, diverse marine fauna and flora.

Conservation issues

The Malindi–Watamu coast is a popular tourist destination, with numerous beach hotels, and coral reefs are one of the major attractions. Management of visitors has been inadequate in the past: delicate corals were trampled on by tourists, or smashed by boat anchors. The situation is improving through tourist education, provision of moorings, and better policing. Another, more insidious, threat to the reefs comes from poor land-use in the catchment of the Sabaki River. Soil erosion has greatly increased silt loads, which are deposited in the sea just north of Malindi, killing corals or reducing their growth.

Fishing and other use of marine resources is permitted, under licence, in the Reserves but not in the Parks. Over-exploitation, illegal fishing and collection of coral and shells remain problems, and are difficult to control. Disturbance by tourists visiting the tern colonies on Whale Island needs to be monitored and regulated, especially now that local hotels are advertising the nesting terns as an attraction.

The integrity of Mida Creek depends on conserving the mangrove forests, whose destruction appears to be accelerating. As in other mangrove areas, cutting for building poles is rife and largely uncontrolled. The creek lacks a coherent management plan, and is threatened by allocation of land for a water-side hotel development that would have a major environmental impact. Mida needs to

Congregatory species

1% or more of biogeographic population

Crab-plover (300)	A non-breeding visitor, present mainly August–April. Mida Creek max.: 800; mean of five counts, December–April, 340 (Seys *et al.* 1995)
Lesser Sandplover (250)	Mida Creek max: 1,500 (Seys *et al.* 1995)
Greater Sandplover (650)	Mida Creek max: 1,250 (Seys *et al.* 1995)
Roseate Tern (400)	1,500 pairs nesting on Whale Island, 1967 (Britton & Brown 1971); several hundred pairs frequently nest here, though not each year (Zimmerman *et al.* 1996)
Saunders's Tern (200)	3,700 in Malindi Marine National Reserve, February 1995 (Nasirwa *et al.* 1995a)

Regionally-threatened species

Great Egret	Vulnerable	Occurs in small and variable numbers (max. 15 Mida Creek, five Malindi Marine National Reserve: Seys *et al.* 1995, Nasirwa *et al.* 1995b)


16 Mida Creek, Whale Island and the Malindi–Watamu Coast
Ganda
Malindi
Malindi Marine National Park
Arabuko-Sokoke Forest
Msabaha
Arabuko
Gede
Watamu Marine National Reserve
Watamu
Malindi Marine National Reserve
Mida Creek
Watamu Marine National Park
Whale Island
Indian Ocean
N
0 2.5 5
Kilometres
Forest
Marine National Park
Marine National Reserve
River
Road
Town/Village
IBA Boundary

Whimbrel

be incorporated into conservation planning for this entire complex of protected areas. A comprehensive and integrated plan for use and conservation could also promote the growth of relatively low-impact uses such as eco-tourism and bee-keeping.

Further reading

Brown 1975, IUCN/UNEP 1987, Gang & Agatsiva 1992, Koyo 1994, Nasirwa *et al.* 1995b, Seys *et al.* 1995, Hockey *et al.* 1996

17 MARENJI FOREST

04°29'S, 39°14'E, Coast Province, Kwale District

1,520 ha (c. 1,480 ha forest)

Altitude: 30–160 m

Status: Forest Reserve

Categories: Globally-threatened species, restricted-range species, East African Coast biome species

Site description

Marenji is a relatively large fragment of coastal forest, gazetted as a Forest Reserve in 1967 and located near the Mombasa–Lungalunga road about 1 km from Mrima trading centre. The forest is undifferentiated, on Magarini sands, with a mixture of grassland and scrubby woodland in the valleys. It is surrounded by farmland and grassland. Rainfall is around 1,100 mm per year. Some of the major tree species include *Scorodophloeus fischeri*, *Newtonia paucijuga*, *Combretum schumannii*, *Nesogordonia holtzii*, *Bombax rhodognapholon*, *Afzelia quanzensis*, *Cordyla africana*, *Julbernardia magnistipulata*, *Albizia glaberrima* var *glabrescens*, *Milicia excelsa*, *Diospyros mespiliformis*, *Manilkara discolor* and *M. sansibarensis* (Robertson & Luke 1993).

Tiny Greenbul

Birds

See box and Appendix 3 for key species. This forest holds good and probably viable populations of East African coastal forest species, including the globally-threatened and restricted-range Sokoke Pipit, the near-threatened Plain-backed Sunbird and Fischer's Turaco, and 13 of Kenya's 30 East African Coast biome species.

Other wildlife

There is no information on other fauna. The threatened Black-and-rufous Elephant Shrew *Rhynchocyon petersi* probably occurs, as does the increasingly uncommon Angolan Colobus *Colobus angolensis palliatus*. Of 240 plant taxa, at least 12 plant species occurring in Marenji are considered globally or nationally rare (Robertson & Luke 1993).

Globally-threatened species

*Fischer's Turaco	Near-threatened	Waiyaki (1995)
*Sokoke Pipit	Vulnerable	Recorded by Waiyaki (1995). The population size is not known, but this is likely to be an important site for this species
Plain-backed Sunbird	Near-threatened	Waiyaki (1995)

*also restricted-range species

Regionally-threatened species

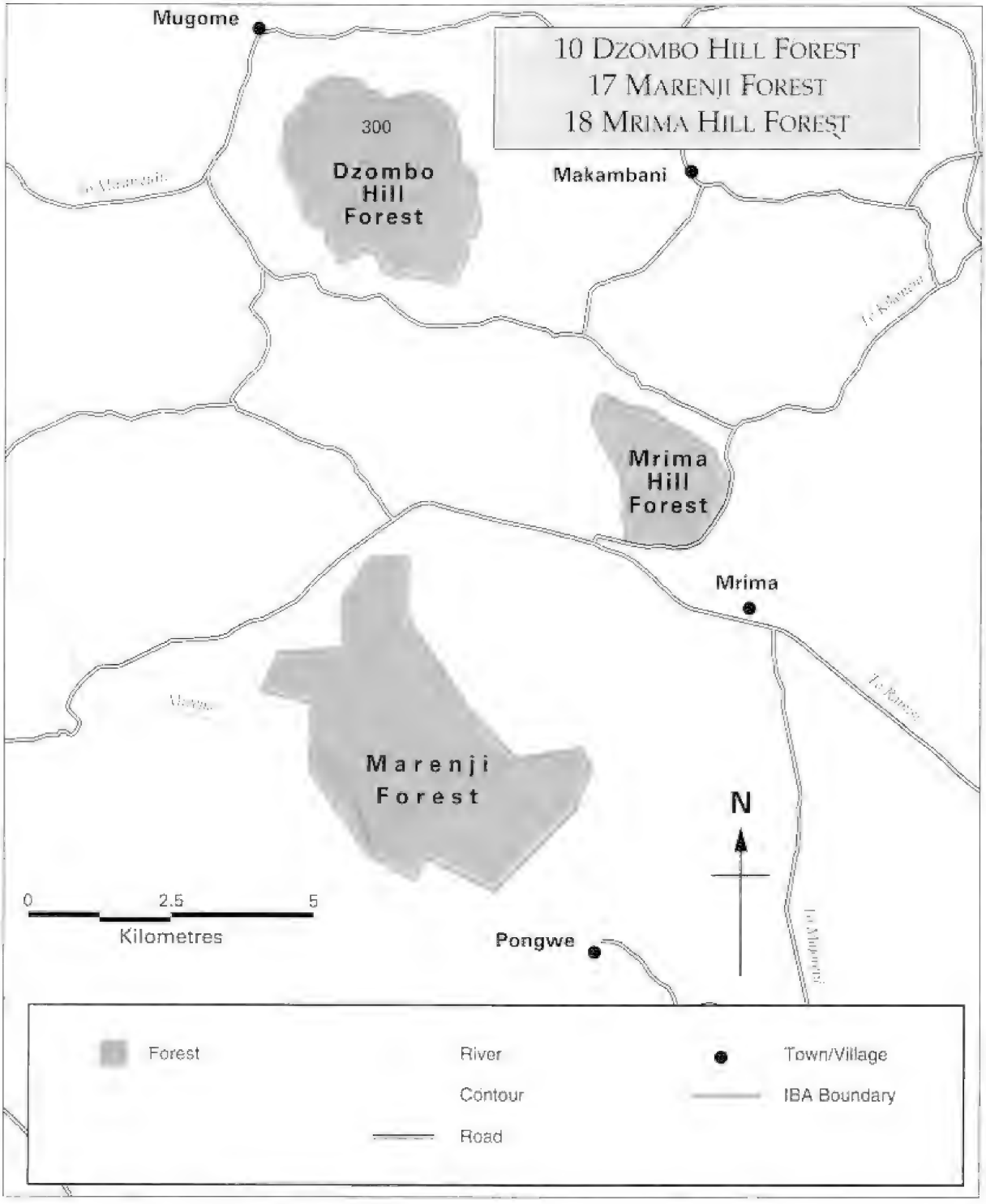
Little Yellow Flycatcher	Vulnerable	Waiyaki (1995)

Conservation issues

Marenji is threatened by commercial logging, mainly for *Scorodophloeus fischeri* and *Newtonia paucijuga*, which has been heavy and damaging to the structure of the forest. Tree poaching (especially of *Combretum schumannii*) for the carving trade, pole cutting and charcoal burning are also prevalent, especially along the eastern and south-eastern boundaries (Robertson & Luke 1993, Waiyaki 1995). Some level of use by local people is probably sustainable, but this should be controlled and based on a management plan that derives from a proper forest inventory. Commercial timber extraction should cease if the forest is to retain its biodiversity values.

Further reading

Robertson & Luke 1993, Mlingwa *et al.*, in press, Waiyaki & Bennun, in press



18 Mrima Hill Forest

04°28'S, 39°16'E, Coast Province, Kwale District *(see map in site account 17)*

250 ha

Altitude: 100–300 m

Status: Forest Reserve, Nature Reserve and National Monument

Categories: Globally-threatened species, East African Coast biome species

Site description

This IBA consists of wet coastal forest on a small hill rising from the coastal plain some 60 km south-west of Mombasa, just west of the main Mombasa-Lungalunga Rd. The hill itself is a part of the alkaline igneous complex centred on Dzombo Hill (IBA 10) and is known to have significant deposits of ores containing manganese and niobium. Mrima has been prospected over several times by geologists and there are many deep test holes, although no large-scale mining has yet taken place. Rainfall is at least 1,100 mm per year, and probably greater, since precipitation is produced as cloud rises over the slopes during the south-east monsoon. The forest is undifferentiated, with exceptional plant species diversity; large trees include *Combretum schumannii*, *Milicia excelsa*, *Terminalia sambesiaca*, *Nesogordonia holtzii*, *Sterculia appendiculata*, *Drypetes usambarica* var *mrimae*, *Cordyla africana*, *Albizia glaberrima* var *glabrescens*, *Newtonia paucijuga*, *Erythrina sacleuxii*, *Antiaris toxicaria*, *Lovoa swynnertonii*, *Zanha golungensis*, *Diospyros mespiliformis*, *Inhambanella henriquesii*, *Manilkara discolor*, *Mimusops aedificatoria* and *Synsepalum brevipes* (Robertson & Luke 1993).

Mrima Forest Reserve was gazetted in 1961, and the site was made a strict Nature Reserve under the Forests Act in the early 1980s. Mrima Hill is also a Kaya, recognised by the site's gazettement as Mrima Hill Sacred Grove National Monument in 1992. The Kayas are relict patches of forest that once sheltered the fortified villages of the Mijikenda people (in Mrima's case, the Digo) on the Kenyan coast. They have spiritual and ceremonial significance and are customarily protected by a Council of Elders.

Birds

See box and Appendix 3 for key species. Mrima holds a non-breeding population of the globally-threatened Spotted Ground Thrush, and supports a rich avifauna characteristic of the East African coastal forests. Forty-seven forest bird species are recorded, including 11 of Kenya's 30 African East Coast biome species. White-starred Robin and Orange Ground Thrush are known from Mrima (Britton *et al.* 1980) but no other

Plain-backed Sunbird

Globally-threatened species		
*Fischer's Turaco	Near-threatened	Fairly common
Spotted Ground Thrush	Endangered	Recorded by Britton *et al.* (1980) and recently by Waiyaki (1995); may be a significant site for this non-breeding visitor
Plain-backed Sunbird	Near-threatened	Fairly common

*also restricted-range species

Regionally-threatened species		
Little Yellow Flycatcher	Vulnerable	Status unknown

Kenyan coastal forests. Both are probably altitudinal migrants.

Other wildlife

Mrima's vegetation is exceptionally diverse. A 1989 expedition recorded over 270 taxa, including 25 that are globally or nationally rare (Robertson & Luke 1993). Among others, the rare trees *Uvariodendron gorgonis* and *Gigasiphon macrosiphon* are known from this site, though the latter was not re-located in a 1989 survey. The rare butterfly *Eresinopsides bichroma* also occurs (Larsen 1991). Mammals include the threatened Black-and-Rufous Elephant Shrew *Rhynchocyon petersi*, Zanzibar Galago *Galagoides zanzibaricus* and Angola Colobus *Colobus angolensis palliatus*. Bats occur in the mine shafts, including the rare and localised Greater Collared Fruit Bat *Myonycteris relicta*.

Conservation issues

Despite its status as a strict Nature Reserve, and now a National Monument, Mrima has suffered badly from selective logging and pole cutting. Numerous *Combretum schumannii* and *Milicia excelsa* were being illegally felled in 1989 and 1992 (Robertson & Luke 1993). The forest is severely degraded in many places, with an open canopy and dense thicket-like undergrowth. The population density around the hill is high, and there has been some encroachment on the lower slopes to the west. Prospective mining, which has been carried on irregularly since 1919, has also affected the forest's structure. Mrima is now littered with deep prospecting holes, each about half a metre in diameter. Though some of these provide roost sites for bats, they act as effective pitfall traps for other vertebrates (including biologists!).

The main threat to the forest remains the possibility of intensive mining for manganese or niobium. Given Mrima's biological importance, and its significance as a Kaya (or 'sacred forest') to the Digo community, any mining proposal should be very carefully evaluated. Certainly no open-cast mining should be countenanced, as this would be extremely destructive to the forest. In the meantime, the Forest Department should recognise fully the conservation importance of this site, and work with the National Museums' Coast Forest Conservation Unit and the Kaya Elders to maintain its integrity.

Further reading

Britton *et al.* 1980, Robertson & Luke 1993, Mlingwa *et al.*, in press, Waiyaki & Bennun, in press

19 Sabaki River Mouth

03°09'S, 40°08'E, Coast Province, Malindi District

Area undefined: c. 200 ha

Altitude: 0–5 m

Status: Unprotected

Category: Congregations

Site description

Sandbanks, mudbanks, dunes and freshwater pools and marshes at the mouth of the Sabaki, Kenya's second-longest river, approximately 5 km north of Malindi town, between the Malindi-Mambrui road bridge and the sea. The state and size of the estuary vary seasonally, depending on river flows. Just north and south of the river mouth are grassy dunes that conceal permanent or temporary pools of freshwater.

Birds

See box for key species. This site hosts large visiting flocks of Madagascar Pratincole, and is an important resting, roosting and feeding ground for gulls and terns. Good numbers of Palaearctic waders also occur, and Broad-billed Sandpiper, a very uncommon bird in Kenya, winters here in flocks of up to 80. The near-threatened, restricted-range Malindi Pipit is resident in and around the grassy dunes.

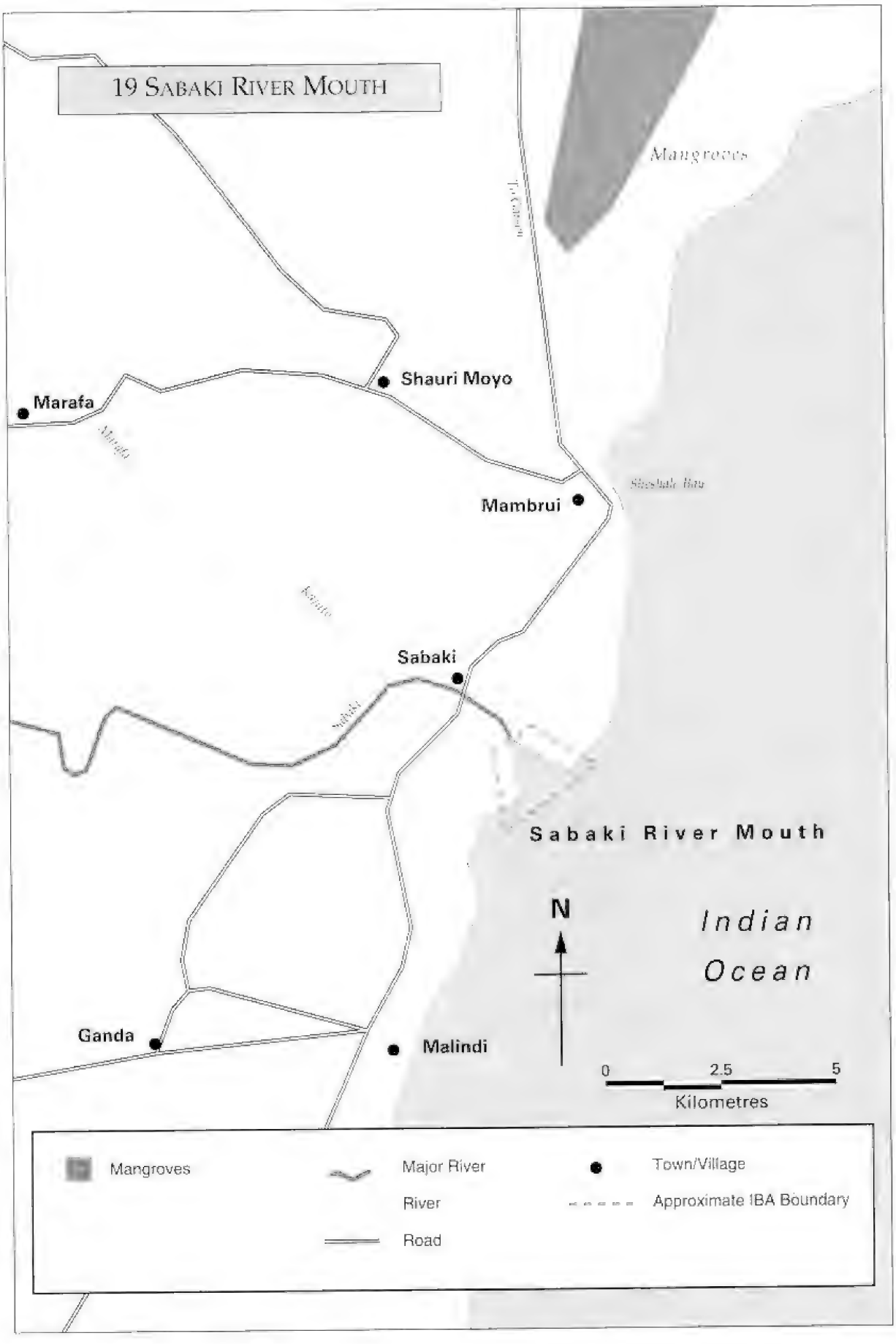
Other wildlife

The estuary is rich in fishes and crustaceans, and supports an important fishery.

Conservation issues

The estuary is unprotected, and heavily used and disturbed by people, although there is little direct harassment of the birds. The livelihood of the local residents (and that of many of the waterbirds) depends on the fishery, but this resource appears to be over-exploited. Soil erosion in the river's catchment is increasing silt loads in the Sabaki, but the effect of this on the estuary's ecology is unknown.

Madagascar Pratincole


19 SABAKI RIVER MOUTH
Mangroves
Shauri Moyo
Marafa
Mambrui
Sabaki
Sabaki River Mouth
N
Indian Ocean
Ganda
Malindi
0
2.5
5
Kilometres
Mangroves
Major River
River
Road
Town/Village
Approximate IBA Boundary

Congregatory species

1% or more of biogeographic population

Madagascar Pratincole (50)	Regularly up to 2,500; maximum 9–10,000 in 1978 (more than the current population estimate!) (Lewis & Pomeroy 1989)
Sooty Gull (400)	Max: 410
Saunders's Tern (200)	Max: 900
Lesser Crested Tern (250)	Max: 270

Except where shown, data from Seys et al. *(1995) and* Nasirwa et al. *(1995b)*

Regionally-threatened species

Great Egret	Vulnerable	Usually present in small numbers
African Skimmer	Vulnerable	Regular visitor, mainly August–March (Lewis & Pomeroy 1989)

The river mouth is a great attraction to birdwatchers. There have been serious problems with security in the past, but it nonetheless could make an outstanding locally-managed bird sanctuary. A research centre is being set up by Moi University on the south bank, between the road bridge and the river mouth.

Further reading

Britton & Britton 1973, Fanshawe 1994, Nasirwa *et al.* 1995b, Seys *et al.* 1995

20 Shimba Hills

4°15'S, 39°25' E, Coast Province, Kwale District
21,740 ha (c. 9,500 ha forested)
Altitude: 120–450 m
Status: National Reserve and Forest Reserve
Categories: Globally-threatened species, restricted-range species, East African Coast biome species

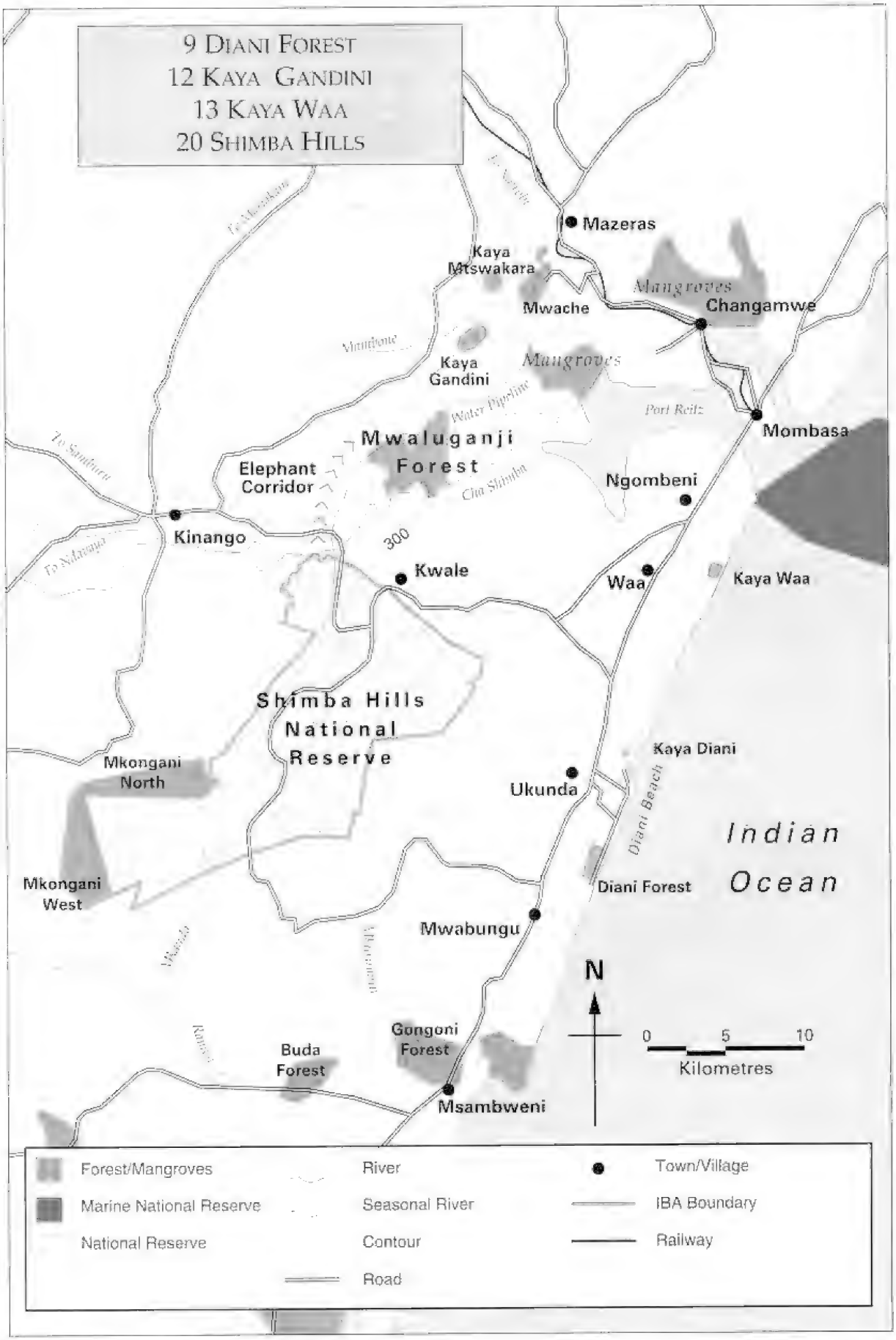
Site description

The Shimba Hills are a dissected plateau that ascends steeply from the coastal plains, some 30 km south-west of Mombasa and just south of Kwale town. The surrounding escarpment rises from around 120 m elevation to c. 300 m across the bulk of the plateau, and as high as 450 m at Marare and Pengo Hills. The underlying rocks are the Triassic Shimba Grits and (in the north-central part near Kwale town) Pliocene Magarini Sands (Schmidt 1991, Blackett 1994d). Rainfall ranges from 900–1,200 mm per year, and rivers flowing from the hills supply fresh water to Mombasa and to the Diani/Ukunda area, immediately to the east.

The Shimba Hills were gazetted as National Forest as long ago as 1903, being one of the few large areas on the south coast that was still well forested. Grassland areas were incorporated in 1924, and several subsequent extensions took place to bring the reserves to their present size. In 1968, most of the area was double-gazetted as the Shimba Hills National Reserve. Two smaller areas to the west adjoining the National Reserve and almost entirely forested, remained as Forest Reserves only: these are Mkongani North FR (1,110 ha) and Mkongani West FR (1,370 ha).

The hills have a heterogeneous mosaic of vegetation, including grassland, scrub and exotic plantations as well as forest. Blackett (1994d) estimated from aerial photographs that 44% (i.e. 9,300 ha) of the total area was forested, and a further 8,000 ha were forest/scrub formations. Grassland or grassland/scrub covered 3,400 ha, the remainder being plantations (600 ha) and other cover. The hills certainly hold one of the largest areas of coastal forest in East Africa after Arabuko–Sokoke (IBA 7) (see Mlingwa *et al.*, in press). Davies (1993a) lists at least six major forest types, including tall *Milicia* forest on the deep soils on the plateau top (in Longomwagandi and Makadara forests, and near Kwale town), and on the western escarpment; *Afzelia-Erythrophloeum* forest, covering much of the eastern and southern escarpment; *Paramacrolobium* forest on particularly steep scarp slopes to both east and west;

Green-headed Oriole


9 Diani Forest
12 Kaya Gandini
13 Kaya Waa
20 Shimba Hills
Mazeras
Kaya Mtswakara
Mwache
Mangroves
Changamwe
Kaya Gandini
Mangroves
Port Reitz
Mombasa
Water Pipeline
Mwaluganji Forest
Elephant Corridor
Cha Shimba
Ngombeni
Kinango
300
Kwale
Waa
Kaya Waa
Shimba Hills National Reserve
Kaya Diani
Mkongani North
Ukunda
Diani Beach
Indian Ocean
Mkongani West
Diani Forest
Mwabungu
N
0 5 10
Kilometres
Gongoni Forest
Buda Forest
Msambweni
Forest/Mangroves
Marine National Reserve
National Reserve
River
Seasonal River
Contour
Road
Town/Village
IBA Boundary
Railway

and *Manilkara-Combretum* forest in the lower, western sector of the plateau. Botanically, these habitat associations are rather more complex, and this classification may be an oversimplification (Q. Luke, *in litt.*). The biggest single patch of forest is in the south-western sector, including Mkongani North and West. Further east and north, the forest breaks up into a complex mosaic interspersed with scrub and grassland. Very few forest patches are entirely isolated from each other, however, as corridors of forest or forest/scrub formations remain.

At least two Kayas, Kwale and Longomwagandi, are situated within the National Reserve. (The Kaya forests have spiritual and ceremonial significance to the Mijikenda people of the Kenya coast.) A fenced elephant corridor connects the Shimba Hills with Mwaluganji Forest Reserve to the north.

Birds

See box and Appendix 3 for key species. Shimba Hills has a rich coastal forest bird fauna, including three threatened and two restricted-range species, and holds 18 of Kenya's 30 East Coast biome species. The relatively large area of forest means that populations of most of these species are likely to be viable. In late March and early April, spectacular concentrations of certain Palaearctic migrants such as Eurasian Cuckoos and Eurasian Golden Orioles move through on passage. The grasslands hold localised species such as Red-necked Spurfowl, Croaking Cisticola and Zanzibar Red Bishop. These are not species of immediate conservation concern, but grassland is vanishing everywhere in Kenya and the habitat protected in the Shimba Hills is valuable.

Other wildlife

Kenya's only population of Sable Antelope *Hippotragus niger* occurs in the Shimba Hills, which

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Fairly common resident
*Fischer's Turaco	Near-threatened	Common in taller forest
Spotted Ground Thrush	Endangered	Recorded in Mkongani (Bennun & Waiyaki 1992e)
*Sokoke Pipit	Vulnerable	Recorded in Mkongani (Bennun & Waiyaki 1992e)
East Coast Akalat	Vulnerable	Patchily distributed, in tall closed-canopy forest. Known from Mkongani (Bennun & Waiyaki 1992e; densities estimated as 0.4 territories/ha by Nemeth 1996); from Longomwagandi, where fairly common in 1992 (Bennun & Waiyaki 1992e) but not relocated in 1996 (Nemeth 1996); and from Makadara (Nemeth 1996).
Plain-backed Sunbird	Near-threatened	Fairly common in closed-canopy forest

**also restricted-range species*

Regionally-threatened species

Ayres's Hawk Eagle	Vulnerable	Recorded, but status unknown
African Crowned Eagle	Vulnerable	Several pairs probably resident
Little Yellow Flycatcher	Vulnerable	Fairly common in closed-canopy forest
African Pitta	Vulnerable	Rarely-recorded non-breeding visitor
Uluguru Violet-backed Sunbird	Vulnerable	Probably the Kenyan stronghold of this little-known species

was the major reason for incorporating grassland areas into the National Reserve. The restricted Black-and-rufous Elephant Shrew *Rhynchocyon petersi* also occurs here together with a distinctive race of the Bushy-tailed Mongoose *Bdeogale crassicauda omnivora*. The forest also holds substantial numbers (estimated as 530 in 1997) of the African Elephant *Loxodonta africana*. The rare fruit bat *Myonycteris relicta* has been collected here (Bergmans 1980). Two frog species, *Afrixalus sylvaticus* and *Hyperolius rubrovermiculatus*, are endemic to the Shimba Hills forests and are believed to be endangered. The little known and range-restricted caecilian *Boulengerula* (formerly *Afrocaecilia*) *changamwensis* also occurs (Duff-MacKay 1980, W.R. Branch, *in litt.*). The butterfly fauna is very diverse, with some 295 species (35% of Kenya's total), including the rare *Acraea aubyni* and *Neptis rogersi*, and the endemic *Charaxes acuminatus shimbaensis*.

The flora of the hills is exceptionally rich and important. A total of 1,100 plant taxa are recorded (Luke, *in* press), around 280 of which are endemic to the Shimba Hills area and nearly a fifth considered rare globally or in Kenya. This qualifies Shimba as a Centre of Plant Diversity, according to the criteria of the Association pour l'Etude Taxonomique de la Flore d'Afrique (Luke, in press). Notable tree species include *Diospyros shimbaensis*, *Cephalosphaera usambarensis*, *Pavetta tarennoides*, *Synsepalum kassneri*, *Bauhinia mombassae*, *Phyllanthus sacleuxii* and undescribed species of *Polyceratocarpus* and *Uvariodendron* (Robertson & Luke 1993).

Conservation issues

Like other coastal forests, the Shimba Hills forests have suffered drastic habitat modification over many years from commercial extraction of timber. *Milicia excelsa* has been a particular target, while *Combretum schumannii* and *Afzelia quanzensis* have been heavily exploited in the drier forest to the west. Commercial exploitation has now largely stopped, but some licenses were (controversially) issued in 1997. A timber inventory in 1992 concluded that the forest had no further potential for timber production and that no logging should be countenanced in any part (Blackett 1994d). Blackett also pointed out that the soils on the hills are generally marginal for plantation forestry (or indeed agriculture), and that the existing plantations have performed very poorly. Demand for timber at the coast is high and growing, so alternative approaches need to be found: two possibilities are plantations on more suitable, disused land, and making better use of existing resources such as coconut trees (Blackett 1994d).

Regeneration of some of the logged-over forests seems to be prevented by the large, increasingly confined elephant population. Elephants use the forests for cover and forage during the day, emerging at night to feed in the grasslands and to raid farms outside the Reserves. Some forest areas, such as the *Milicia* forest in Longomwagandi and *Combretum* forest on the southern edge of the hills, have been severely damaged, as seedlings are eaten and adult trees ring-barked. Chronic elephant damage, causing substantial changes in forest structure, may be the reason that the East Coast Akalat (once relatively abundant) appears to have vanished from Longomwagandi. The Shimba elephant herd has also inflicted very serious damage on adjacent forests such as Kaya Lunguma and Mwaluganji Forest Reserve (Luke, in press). Rather than increasing plant diversity, as has been claimed, elephant browsing appears to alter the natural process of succession and promote nearly mono-dominant stands of non-forest, elephant-friendly species (Luke, in press).

Elephant raids on the surrounding farms have become a serious menace, and in recent years a number of people have been killed in elephant attacks. Elephants also inflict considerable damage on the *Pinus caribaea* plantations (which are poorly performing, but nowadays tapped for resin). Fencing off the Reserve and/or the plantations would reduce the elephant problem externally, but increase the internal pressure on the forests from a confined and hungry herd. The diversification of eco-tourism to include forest walks, birdwatching and so on, to which Shimba is well-suited, is presently impossible because of the elephant presence.

Local use of forest resources is highest on the densely-settled eastern fringe. In 1992, removal of *Parmacrolobium* bark for fibre was causing the death of perhaps 10% of the trees in this area (Davies 1993a), with around 84% damaged. Hunting pressure is also substantial on this side of the forest.

The continued early burning of the plateau grasslands is important to provide grazing for the Sable Antelope and other large herbivores. Burning may also help to check the advance of the exotic

weed *Lantana camara*, which has invaded many of the clearings. However, burning can damage forest if not carefully controlled, and may inhibit forest regeneration.

The threats facing Shimba point to the need for a genuinely integrated management programme, that deals with forest conservation, grassland management, problem animal control and local use of forest products. The Forest Department and Kenya Wildlife Service are already joint managers of the Reserve, but do not always work effectively together. Some recommendations made by previous studies (e.g. Davies 1993a) may be taken up by the GTZ-funded Shimba Hills Integrated Natural Resources Management and Conservation Programme (INREMAC). (Though this project is currently in abeyance.) These include:

- carefully planned elephant-fencing of sections of the Reserve, and creating additional corridors for elephant movements;
- gazettement of Nature Reserves in Longonwagandi and Makadra, perhaps as the core of a well defined protection zone;
- fencing key forest areas within the Reserves to keep out elephants (and to allow visitors to walk and look at plants, butterflies and birds);
- complete cessation of commercial logging;
- clear-felling of the current plantations, allowing natural vegetation to regenerate, and a shift to agroforestry and forestry extension on farms around the forest;
- defining zones for complete protection and for controlled forest use, and ensuring that controls are appropriate and effective.

Further reading

Glover 1969, Rose 1981, Schmidt 1991, Bennun & Waiyaki 1992e, Davies 1993a, 1994, Robertson & Luke 1993, Nemeth 1996, Luke, in press, Mlingwa *et al.*, in press, Waiyaki & Bennun, in press

Uluguru Violet-backed Sunbird

21 Taita Hills Forests

3°25'S, 38°20'E, Coast Province, Taita-Taveta District

c. 400 ha

Altitude: 1,350–2,228 m

Status: Gazetted or proposed Forest Reserves

Categories: Globally-threatened species, restricted-range species

Site description

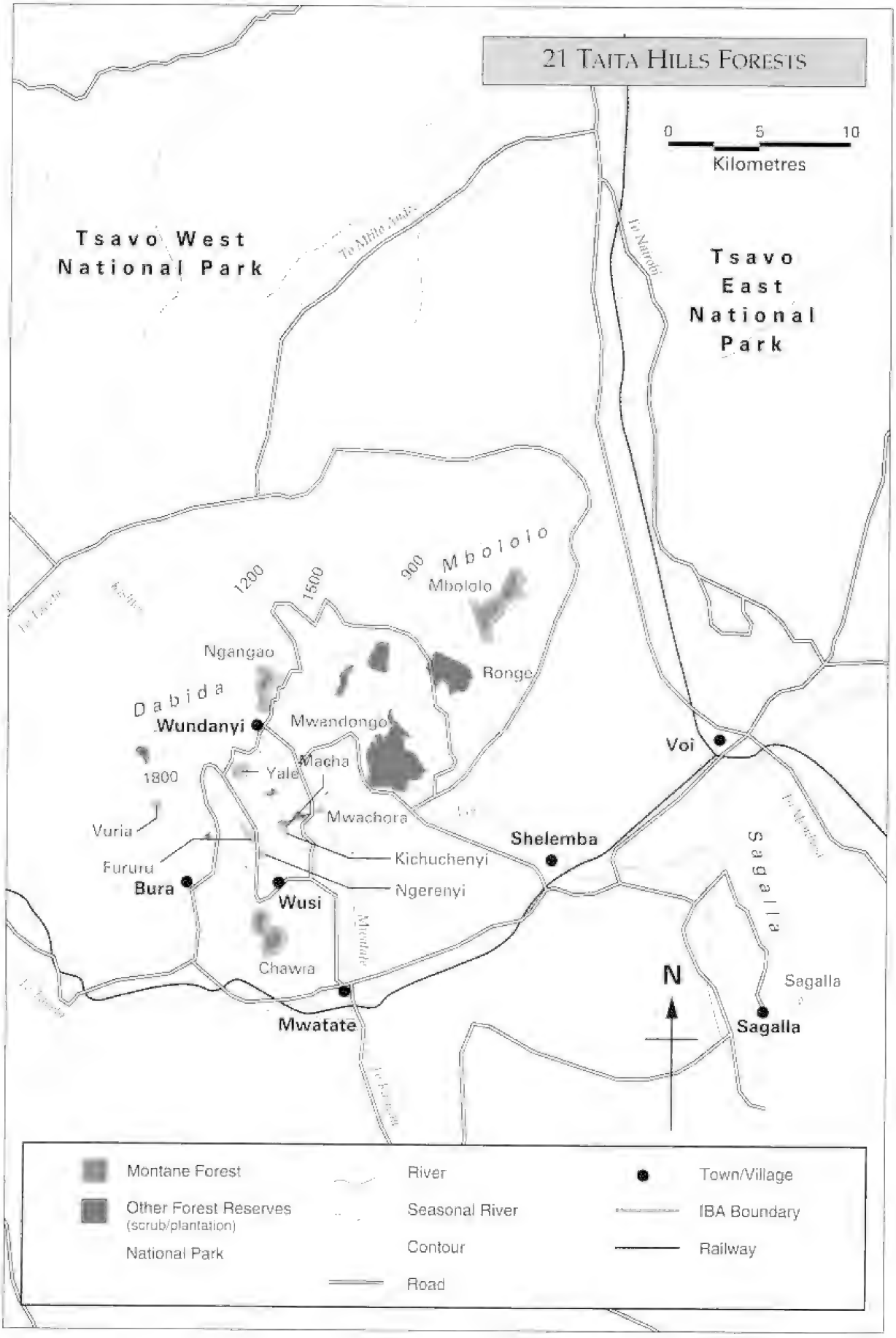
The Taita Hills lie in south-eastern Kenya, south and west of Voi town, and rise abruptly above the semi-arid plains of Tsavo West National Park. These plains, at around 600–700 m altitude, isolate the hills from other mountains and highland blocks. The closest of these are the Chyulu Hills (IBA 28) and North Pares, about 70 km away, and Mt Kilimanjaro, about 80 km away. The West Usambara mountains, with which the Taita Hills have some botanical affinities, are around 120 km distant.

The Taita Hills are divided into three main blocks. Sagalla Hill (peak 1,450 m), directly south of Voi, is separated from the rest of the hills by the Voi River on the plains. The main body of the hills, Dabida, lies 25 km north-west of Voi, including the high peaks of Ngangao (2,149 m) and Vuria (2,228 m). To the north-east of this range lies the massif of Mbololo (2,209 m), separated from the main block by a valley at about 900 m. Some 50 km to the south-east, and not included within this IBA, lies Mt Kasigau. The forest on this isolated peak has biogeographical affinities with the Taita Hills, but its fauna and flora are as yet little studied.

The hills are made of metamorphic rock covered by a hard quartzite cap. Geologically, they are the northernmost outpost of the ancient Eastern Arc mountains of Tanzania and Malawi. At the base of the hills, rainfall is only some 600 mm per year. This rises to around 1,300 mm on the top, with local variation: the south-eastern slopes catch the moist monsoon winds and are wetter, while the north-western ones are drier. Mist and cloud form throughout the year, and there is substantial 'occult' precipitation, especially within the forests.

Dry bushland runs up the flanks of the hills, giving way rather abruptly near the top to small-holder cultivation and remnant patches of moist forest. The area is heavily settled. The total population is around 250,000, and densities reach 1,400 people per km^2 in places. Cultivation is intensive, with maize the most conspicuous crop. As a result of the high human pressure on land, forest remains today only as scattered fragments on the hilltops and ridges. Sagalla retains only about 3 ha of moist forest and Mbololo some 220 ha along the hill crest, while the main block has a number of tiny remnants, including Fururu (12 ha), Mwachora (4 ha), Macha (3 ha), Ngerenyi (3 ha), Kichuchenyi (2 ha), Yale (2 ha) and Vuria (1 ha), and two larger patches: Chawia (c. 50 ha) and Ngangao (c. 92 ha) (L. Lens, *in litt.*; areas based on mapping carried out in 1997). The gazettement of all these sites as Forest Reserves has been approved by Wundanyi County Council for many years. However, while a number of smaller patches (including plantation forest) have been gazetted, the main blocks of Sagalla,

Taita Thrush


21 TAITA HILLS FORESTS
0 5 10
Kilometres
Tsavo West National Park
Tsavo East National Park
To Mtito Andei
To Nairobi
1200
1500
900
Mbololo
Mbololo
Ngangao
Ronge
Dabida
Wundanyi
Mwandongo
Macha
Yale
1800
Vuria
Mwachora
Kichuchenyi
Ngerenyi
Fururu
Bura
Wusi
Chawia
Mwatate
Voi
Shelemba
Sagalla
Sagalla
N
Montane Forest
Other Forest Reserves (scrub/plantation)
National Park
River
Seasonal River
Contour
Road
Town/Village
IBA Boundary
Railway

Chawia, Ngangao and Mbololo (though managed by the Forest Department) still have not.

All the forests have been logged over for valuable timber trees, and substantial portions have been planted with exotic conifers. *Ocotea* spp. were once common in the forests, but have been almost entirely logged out. Other characteristic trees are *Tabernaemontana stapfiana* and *Maesa lanceolata* (growing especially where the forest has been heavily disturbed), *Albizia gummifera*, *Chrysophyllum gorungosanum*, *Cola greenwayi*, *Macaranga conglomerata*, *Newtonia buchananii*, *Syzygium sclerophyllum*, *Xymalos monospora* and the palm *Phoenix reclinata* (Beentje 1988).

The Taita Hills forests have been isolated for a long time from other moist forests, and have themselves been fragmented for at least a century. Forest loss since the 1960s has been very substantial, however, estimated as 99% for Vuria, 95% for Sagalla, 83% for Chawia, 50% for Ngangao and under 50% for Mbololo (Brooks *et al.*, in press, a). Despite their small size, the forests are important for water catchment (supplying the Voi river and various local streams) and for soil conservation.

Birds

See box for key species. Three endemic bird taxa occur: the Taita Thrush *Turdus (olivaceus) helleri*, Taita White-eye *Zosterops (poliogaster) silvanus* and Taita Apalis *Apalis (thoracica) fuscigularis*. All three are recognised as full species by Collar *et al.* (1994), but only the thrush is given this status by the EANHS Ornithological Sub-committee (1996), who consider the others to be distinctive sub-species of the Montane White-eye and Bar-breasted Apalis, respectively. Further taxonomic analysis is awaited. Whatever the conclusion, these three distinctive endemics are confined to tiny remnant forests and are severely threatened.

The Taita Hills are treated as part of the Tanzania-Malawi Mountains Endemic Bird Area (Stattersfield *et al.* 1998), but they share no restricted-range bird species with the other sites in this EBA. In fact, their avifauna is generally more closely related to that of the Kenyan Mountains EBA (Stuart *et al.* 1993, Brooks *et al.* in press, b), with which they share the restricted-range Abbott's Starling. The flora, however, shows a strong Eastern Arc element (e.g. Beentje 1988) and the birds show an element from the northern Tanzanian highlands, for instance through the presence of Stripe-cheeked Greenbul (also on the Chyulu Hills), the race *helleri* of White-starred Robin, the race *otomitra* of Orange Ground Thrush, and Yellow-throated Woodland Warbler. There is also a coastal element (mainly at the lower-elevation Sagalla), with four out of Kenya's 31 East African Coast biome species present. The avifauna is generally impoverished compared to larger, less isolated blocks of forest: only 14 out of the 67 African Highland Biome species regularly occur (though Taita Thrush, Taita Apalis and Taita White-eye, also placed in this biome, are found only here).

Other wildlife

Levels of endemism in the Taita Hills are generally very high, reflecting the forests' long isolation. There is an endemic rear-fanged snake *Amblyodipsas teitana*, an endemic caecilian *Afrocaecilia taitana*, an endemic toad *Bufo teitensis*, and two frogs that are otherwise confined to the Usambaras (in the Eastern Arc mountains of Tanzania). Three butterflies, the Taita Glider *Cymothoe teita*, Taita Charaxes *Charaxes xiphares desmondi* and Taita Swallowtail *Papilio desmondi teita* are endemic to these forests and their fringes (Larsen 1991). At least nine plant species are endemic, including the trees *Coffea fadenii*, *Psychotria crassipetala*, *Memecylon teitense* and *Zimmermannia ovata*; an undescribed *Psychotria* may already be extinct (Beentje 1988). The African Violet *Saintpaulia teitensis* has a global range of about 0.5 ha on Mbololo (Beentje *et al.* 1987). Another 26 plant species are endemic to the Eastern Arc forests.

Conservation issues

The tiny size of the Taita Hills forests, and the dense human population surrounding them, make them extremely vulnerable. Most of the fragments are already heavily disturbed. The largest and least accessible, Mbololo, is also the most intact; Ngangao has suffered substantial damage; and in the small fragments, almost all the large-circumference trees have been cut (Wilder *et al.*, in press). Chawia is still losing its small and easily-cut trees. The biodiversity importance of the forests is still little appreciated by their custodians. When a broadcasting transmitter post was built on the hill crest in Chawia in 1997, for example, environmental impacts were not even considered, let alone assessed, and around 4 ha of prime indigenous forest was simply clear-felled.

Conservation of these unique forests will require integrated planning and action. Several initial steps

Globally-threatened species

Taita Falcon	Vulnerable	Early specimens collected at the base of these hills (Zimmerman *et al.* 1996); no recent records
*Taita Thrush	Critical	Taita forests endemic, a forest-specialist species presently known from Mbololo (where most common), Ngangao, Chawia and Yale (Brooks *et al.* in press, a, E.M. Waiyaki, *in litt.*)
*Taita White-eye	Critical	Taita forests endemic, but the most adaptable of the three, recorded at most forest patches apart from Sagalla, and in scrub and remnant trees (Brooks *et al.* in press, a). Its status should perhaps be downlisted to Endangered.
*Taita Apalis	Critical	Taita forests endemic, only recorded on the main massif (in Ngangao, Chawia, Fururu and Vuria), not on Sagalla or Mbololo (Brooks *et al.* in press, a)
*Abbott's Starling	Vulnerable	Up to 20 recorded at Chawia (Brooks *et al.* in press, a); may be an overlooked seasonal visitor
Southern Banded Snake Eagle	Near-threatened	One record from Chawia (Brooks *et al.* in press, a)

**also restricted-range species*

Regionally-threatened species

Ayres's Hawk Eagle	Vulnerable	Status unknown; no confirmed records (Brooks *et al.*, in press, a)

are obvious. Those forests that have not yet been gazetted, should be, as strict Nature Reserves under the Forests Act. Even this status may not afford adequate protection. Kenyan law presently lacks provision for small nature reserves to be designated for their biodiversity importance. The draft new Museums Bill, which has not yet been presented to Parliament, allows such sites to be gazetted as National Monuments. If this legislation comes into force, the Taita Hills forests would be an obvious place to apply it.

Plantations of exotic trees, mainly conifers, make up a substantial area of all the major fragments. These plantations appear to be performing poorly. However, indigenous vegetation is regenerating underneath the canopy. Controlled felling that allows gradual natural forest regrowth could eventually increase the indigenous forest area substantially. At the same time, it is clear that the increasing demand by the surrounding population for fuelwood, poles and other forest products simply cannot be met sustainably from the natural forests. Strict control of forest use is needed, combined with agroforestry extension programmes to help people to meet these needs on-farm. Extraction of medicinal plants and bark might still be possible under a careful licence system.

Some compensation for the loss of forest products might come from the development of eco-tourism in the Taita Hills. The hills are accessible and conveniently located near the main Nairobi-Mombasa road. They are scenic, and offer spectacular views from many places, and the forests have much to interest any naturalist (and certainly any birdwatcher). The forests are easy and safe to walk in – unlike many other sites, there are no dangers from wild animals, and general security is good in the area. Sites like Ngangao and Chawia could be sensitively developed for visitors, with walking trails, information boards, trained local guides and accommodation at campsites or in local guest houses. Such an approach has been successful elsewhere in the world.

Some of these issues are already being taken up by the East African Wildlife Society, which is running a community-based conservation programme that should eventually give rise to an integrated conservation plan (Gachanja 1997). A programme of research into the forest's biodiversity and the effects of fragmentation is also underway, run jointly by the National Museums of Kenya, Kenyatta University and the University of Antwerp (Lens & de Meyer, in press). However, nothing may happen with the necessary urgency unless decision makers at all levels are convinced of the exceptional importance of these sites.

Further reading

Collins & Clifton 1984, Beentje *et al.* 1987, Tetlow 1987, Beentje 1988, Brooks *et al.* 1997, in press a & b, Gachanja 1997, Lens & de Meyer, in press, Wilder *et al.*, in press

22 Tana River Delta

02°30'S, 40°20'E, Coast Province, Tana River and Lamu Districts

Area: 130,000 ha

Altitude: 0–37 m

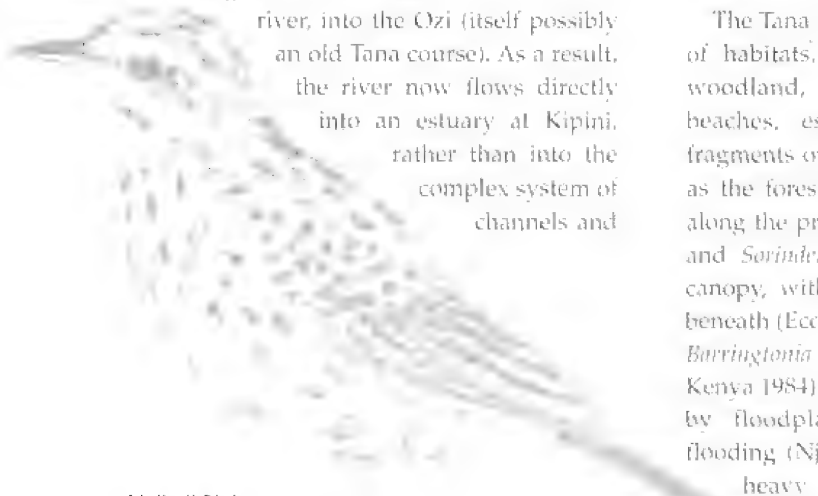
Unprotected

Categories: Globally-threatened species, East African Coast biome species, congregations

Site description

The Tana Delta is the name loosely given to the floodplain ecosystem of the lower Tana River, a vast wetland complex on the Kenyan coast. The delta is roughly triangular in shape, with its apex at Lake Bilisa (north of Garsen) and its base a 50 km stretch of beach along Ungwana (or Formosa) Bay, stretching from Kipini in the north-east to Mto Kilifi in the south-west. This low-lying area is bounded by higher land to the east and west, and to the south by a dune system bordering the Indian Ocean. It forms the interface between the river and the ocean, with fresh and brackish lakes and streams, freshwater and saline grasslands and wetlands, and successional stages of forest and woodland on the riverbanks and the dune ridges parallel to the shore (Robertson & Luke 1993).

The mouth of the river has shifted many times. Today, the main stream of the Tana follows an artificial course. More than a century ago, the flooded river cut through into a canal dug for navigation from Belazoni, on the main river, into the Ozi (itself possibly an old Tana course). As a result, the river now flows directly into an estuary at Kipini, rather than into the complex system of channels and distributaries leading to its old mouth at Mto Tana. Until recently, some fresh water still flowed into the 'old' delta through one of these channels, the Kalota Brook. However, since 1988 this has been blocked by a small dam built by Pokomo farmers, who use the tidal bore to push fresh water into their fields and irrigate their crops.



Malindi Pipit

The entire floodplain in the lower parts is covered by alluvial sediments, transported and deposited during the annual flooding of the river. These lie over quaternary sediments that include marine sands, mud and coral breccia. Moving inland, the rainfall drops from around 1,000 mm per year at Kipini to less than 600 mm at Garsen. Flooding happens not as a result of local precipitation, but because of rain in the river's catchment on Mt Kenya (IBA 3) and the Aberdare Mountains (IBA 1). Normally, the major floods occur in April–May, with a smaller, short-rains flooding in October –November. The timing, extent and duration of the flooding vary greatly from year to year.

The Tana River Delta contains a very wide variety of habitats, including riverine forest, grassland, woodland, bushland, lakes, mangroves, dunes, beaches, estuaries and coastal waters. Small fragments of riverine forest, not nearly as extensive as the forests north of Garsen (see IBA 23), occur along the present or former river courses. *Diospyros* and *Sorindeia madagascariensis* dominate the main canopy, with *Cola clavata* and *Garcinia livingstonei* beneath (Ecosystems Ltd. 1985). *Phoenix reclinata* and *Barringtonia racemosa* are also prominent (Survey of Kenya 1984). Some 67,000 ha of the delta are covered by floodplain grasslands, subject to seasonal flooding (Njuguna 1992). The extensive areas with heavy clay soils are covered by grasslands dominated by *Echinocloa haploclada*, along with *E. stagnina*, *Sporobolus helvolus*, *Panicum maximum* and *Cynodon dactylon* (Survey of Kenya 1984). In areas that remain seasonally flooded for long periods, the sedge

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Uncommon in riverine forest (Zimmerman *et al.* 1996), but not recorded in recent surveys (O. Nasirwa, *in litt.*); exact status unclear
*Basra Reed Warbler	Near-threatened	Common non-breeding visitor in flood plain thicket, especially salt-bush vegetation, from November to April; this is probably the main wintering ground for this species (Pearson *et al.* 1978, Lewis & Pomeroy 1989, Zimmerman *et al.* 1996)
Malindi Pipit	Near-threatened	Widespread at low densities in the flood plain (Zimmerman *et al.* 1996)

**also restricted-range species (in breeding quarters)*

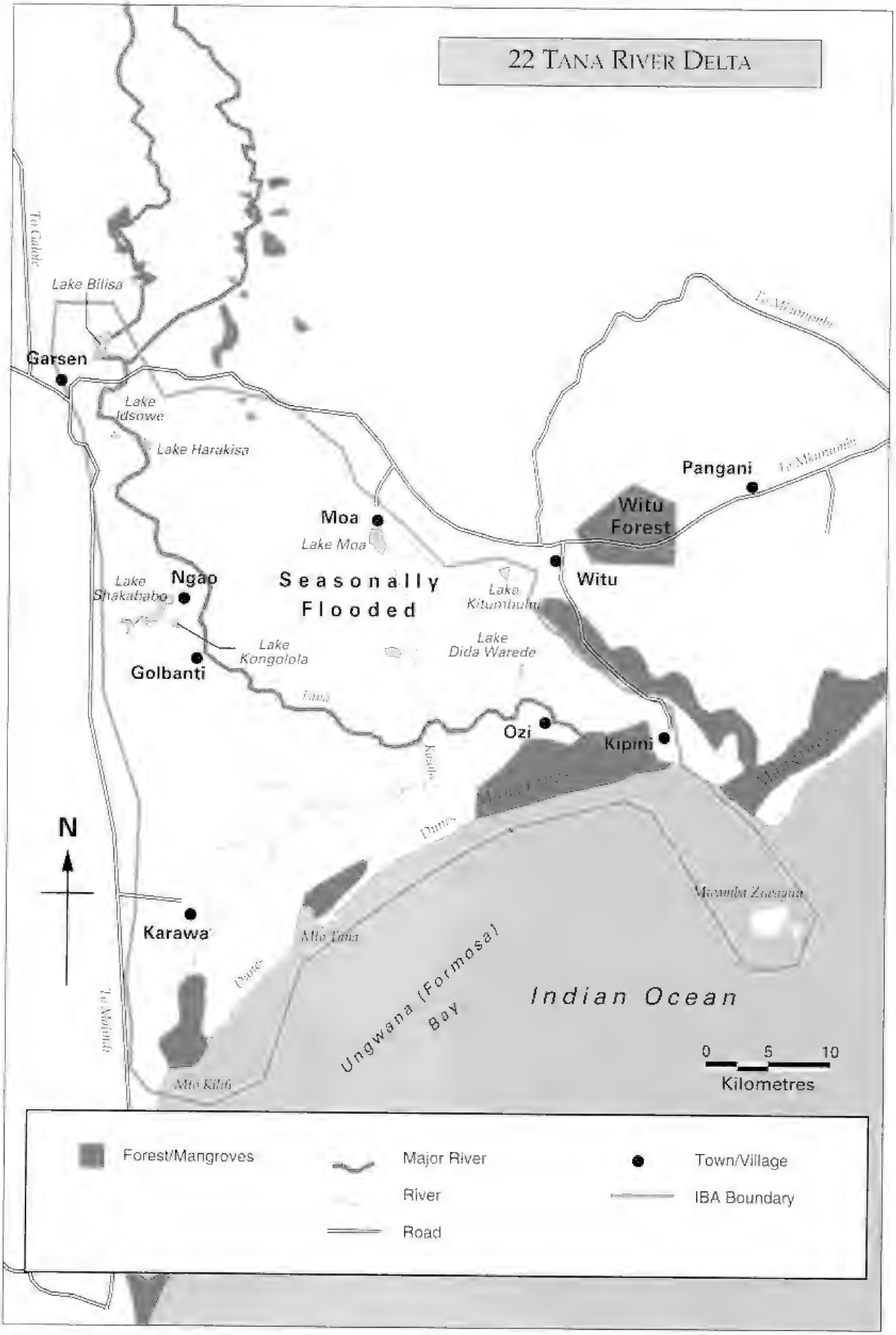
Cyperus rotundus dominates, with *Echinochloa colonum*. Grasslands of *Digitaria ulscendens* and *Sporobolus confusis* occur in more elevated, sandy areas, such as the levees along old river courses. Inland of the coastal sand dunes and mangroves, saline grasslands are dominated by the spiky *Sporobolus spicatus* and the salt-bush *Suaeda monoica*.

West of the floodplain is bushland, with a diverse composition including species of *Boscia*, *Combretum* and *Commiphora*. Wooded bushland or grassland, with fire-resistant Doum Palms *Hyphaene coriacea*, *Terminalia spinosa* and *Thespesia danis*, occupies a broad swathe east of the floodplain, merging (through an intermediate woodland that includes *Diospyros consii* and *Croton dichogamus*) into the Boni Forest vegetation to the north.

Other bushland associations form a complex mosaic with the floodplain grasslands. Areas of bushed grassland on slightly raised ground are dominated by *Acacia zanzibarica* with the grass *Sporobolus helvolus*. Denser patches of wooded bushland thicket include the shrubs *Dobera glabra*, *Grewia* sp. and *Commiphora schimperi*, with *Panicum* sp., *Leptothrium senegalense* and *Cenchrus ciliaris* among the grasses. Parallel to the coast along Ungwana Bay run lines of high dunes, some as much as 37 m above the sea. These are covered by their own distinctive vegetation, a dense thicket dominated by *Dombeya* sp. and *Grewia similis*. In the valleys the thicket mingles with taller trees, such as the palms *Hyphaene coriacea* and *H. compressa*, *Garcinia livingstonei*, *Euphorbia candelabrum* and *Afzelia quanzensis*.

Palms are prominent in many places, with Borassus *Borassus aethiopum* and the Wild Date Palm *Phoenix reclinata* as well as Doum Palm *Hyphaene coriacea*. In places, especially those cleared and burned in the past, these form substantial tracts of palm-bushed grassland (Ecosystems Ltd. 1985). Tall mangrove forest, with all of Kenya's eight mangrove species represented, grows at Kipini in the Tana estuary and along the network of channels further south.

As well as seasonal wetlands in the oxbows and floodplain depressions, the delta contains a number of more-or-less permanent lakes and marshes. These include Lakes Bilisa, Dida Waredе, Harakisa, Kongolola, Kitumbuini, Moa and Shakababo. Some of these may dry out in certain years (O. Nasirwa, *in litt.*), but others, like Lake Shakababo and Bilisa, maintain true aquatic plants (including Nile Cabbage *Pistia stratiotes* and Water Lily *Nymphaea* sp.) and good populations of several species of fish (Ecosystems Ltd. 1985, Njuguna 1992). Luo and Luhya immigrants to the area are responsible for an active and thriving fishery, while Orma pastoralists use these wetlands as dry-season grazing areas for their livestock. Fishermen also camp for days or weeks, while catching, salting and drying fish, on the coral outcrops of Mwamba Ziwayuu, some 10 km offshore from Kipini. About 10 ha of coral is


22 TANA RIVER DELTA
Lake Bilisa
Garsen
Lake Idsowe
Lake Harakisa
Pangani
Witu Forest
Moa
Lake Moa
Lake Shakababo
Ngao
Seasonally Flooded
Lake Kitumbului
Witu
Lake Kongolola
Golbanti
Lake Dida Warede
Ozi
Kipini
N
Karawa
Ungwana (Formosa) Bay
Indian Ocean
0 5 10
Kilometres
Forest/Mangroves
Major River
River
Road
Town/Village
IBA Boundary

exposed here at low tide, shrinking to a set of nine small coral platforms when the tide is high.

The other main ethnic group in the area, the Pokomo, are agriculturalists who cultivate a narrow strip on either side of the river, and around the seasonal and permanent wetlands. As the floods start to recede, rice is planted in the shallow water. Several crops of rice follow the water as its level drops, and other crops, such as maize and sweet potatoes, are planted on the drying mud (Ng'weno 1993). As well as small-scale cultivation, there is an irrigation scheme growing rice in traditional style at Ozi, near Kipini, and a much larger, mechanised one upstream, east of Garsen, that is eventually intended to cover as much as 16,000 ha.

Birds

See boxes and Appendix 3 for key species. The Tana River Delta is a stronghold for two near-threatened species, Malindi Pipit and Basra Reed Warbler, and 13 of Kenya's 30 East African Coast biome species occur. The wetlands, including the coastline and offshore islets, at times hold exceptional concentrations of waterbirds. Internationally-important populations have been recorded here for no fewer than 22 species, during the flood season, the no-flood season, or both (O. Nasirwa, unpubl.

Congregations

More than 20,000 waterbirds

Mean: 70,000; no-flood season 75,000, flood season, 65,000.

1% or more of biogeographic population

	Mean	No-flood	Flood
Great White Pelican (1,800)	1,215	360	**2,070**
Pink-backed Pelican (1,000)	**1,385**	**2,500**	270
Cattle Egret (10,000)	6,230	**11,270**	1,190
Yellow-billed Egret (1,000)	**1,010**	**2,000**	20
Great Egret (500)	**1,440**	320	**2,560**
African Open-billed Stork (1,000)	**2,470**	**3,530**	**1,410**
Yellow-billed Stork (500)	**845**	**970**	**720**
African Spoonbill (150)	**2,165**	**3,680**	**650**
Greater Flamingo (1,250)	1,170	**2,240**	90
Spur-winged Goose (3,750)	2,805	210	**5,400**
White-fronted Plover (1,000)	650	230	**1,070**
Lesser Sandplover (250)	**1,205**	70	**2,340**
Little Stint (10,000)	**10,150**	**15,310**	4,990
Curlew Sandpiper (7,500)	6,875	790	**12,960**
Marsh Sandpiper (550)	**855**	**1,690**	20
Sooty Gull (400)	690	830	550
Slender-billed Gull (100)	380	490	270
Gull-billed Tern (270)	**1,120**	**1,450**	**790**
Caspian Tern (250)	**860**	**1,340**	**380**
Lesser Crested Tern (250)	**1,275**	**1,670**	**880** *
Saunders's Tern (200)	**1,840**	70	**3,610** **
Whiskered Tern (1,000)	950	**1,450**	450

*470 counted on Mwamba Ziwayuu

**2,440 counted on Mwamba Ziwayuu

Bold indicates internationally-important level. All data from unpublished survey work by O. Nasirwa, involving waterbird counts at most major wetlands in the delta, along the estuary and beaches and on Mwamba Ziwayuu (flood season only). No-flood season, June–November 1993, flood season, December 1993–February 1994.

data). This makes the Delta one of the key sites in the country for waterbird conservation. The Tana Delta also houses one of the very few (and therefore highly important) breeding sites for colonial waterbirds in Kenya. This heronry is near Idsowe, south of Garsen, on Ziwa la Matomba, a seasonally-flooded lagoon where the birds nest in a thicket of *Terminalia brevipes*, usually between May and September but also at other times if the lagoon is flooded. Up to five thousand colonial waterbirds of at least thirteen species have been recorded nesting here, including African Darter, Grey, Purple, Black, Common Squacco and Black-crowned Night Herons, Great, Yellow-billed and Little Egrets, African Open-billed Stork, Sacred and Glossy Ibises, and African Spoonbill (North 1959, Britton 1974, Coverdale *et al.* 1983, O. Nasirwa, *in litt.*). Mwamba Ziwayuu, a small coral platform offshore from the Tana estuary, is a resting site for significant numbers of Saunders's Tern and Lesser Crested Tern that feed in Ungwana Bay (O. Nasirwa, *in litt.*).

Other wildlife

The importance of the Tana River Delta lies in the expanse, intactness, variety and productivity of its habitats. The floodplain is grazed by a number of ungulates, including the restricted East African coast sub-species of Topi, *Damaliscus lunatus topi*, with some 30,000 or so in the area (Ecosystems Ltd. 1985). The rivers and channels support large numbers of Hippopotamus *Hippopotamus amphibius* (estimated at 400–450: Ecosystems Ltd. 1985) and Nile Crocodile *Crocodylus niloticus*. Ungwana Bay is one of the few places where Dugong *Dugong dugon*, critically endangered in the region, has been recorded recently. The turtles *Chelonia mydas*, *Eretmochelys imbricata* and *Lepidochelys olivacea* nest on the sandy beaches. Whitehead (1959) lists 22 freshwater fish species from the lower Tana, including three eels *Anguilla* spp. and a distinct sub-species of *Petrocephalus catastoma*. The mangroves provide vitally important spawning and nursery grounds for many species of fish and crustaceans.

The extensive mangrove forests include the only significant stands in Kenya of *Heritiera littoralis*, and two other species that are considered threatened, *Xylocarpus granatum* and *Bruguiera gymnorrhiza* (Wass 1995). 280 plant taxa are recorded for the delta, and many more undoubtedly occur as there has been no thorough botanical survey; of these, 18 are considered rare in Kenya or globally (Robertson & Luke 1993).

Conservation issues

Disputes over the rights to water and land are at the heart of the complex conservation problems facing the Tana River Delta. The importance of the area for conservation is widely recognised, but there is little agreement on the appropriate steps forward, and the site remains without any formal protection.

The numerous patches of riverine forest, woodland and bushland in the delta are edaphic in origin, and their continued existence depends on critical minimum levels of flooding. The flood regime has already been disrupted by five large

Regionally-threatened species

African Darter	Vulnerable	Still present in moderate numbers (O. Nasirwa, *in litt.*), and up to 100 pairs have bred at the Idsowe heronry (Coverdale *et al.* 1983).
Great Egret	Vulnerable	An important site for this species, with more than 2,500 recorded in the flood season (O. Nasirwa, unpubl. data), and several hundred pairs breeding at the Idsowe heronry (North 1959)
Saddle-billed Stork	Vulnerable	Regular visitor in small numbers, May to September (Zimmerman *et al.* 1996)
Scaly Babbler	Vulnerable	Local and uncommon in thickets (Zimmerman *et al.* 1996)

water impoundments upstream (including Masinga Reservoir, IBA 30). A proposed new pair of dams to be built by the Mutonga-Grand Falls Hydropower Project has the potential for even more serious impacts (Butynski 1995). Environmental impact assessment suggested that the new dams would greatly reduce river discharge, silt deposition and the level of groundwater. However, the present design of the Low Grand Falls dam incorporates an artificial flood and sediment release facility. This is intended to release sediments and artificial floods twice a year, around April and November. Mutonga Dam will also have sand-flushing facilities (F. Ng'weno, *in litt.*). It remains to be seen how effective these measures will be, and control of the decision-making for when and how floods will be released remains controversial. (See also Tana River Forests, IBA 23.)

A major rice irrigation scheme has been initiated in the Tana Delta by the Tana and Athi Rivers Development Authority, with funding from the Japanese Government. Four thousand hectares are presently under production near Garsen (Becha 1997), and the scheme is creating considerable employment. It has also damaged riverine forest (Robertson & Luke 1993) and, if expanded to the planned 16,000 ha, will convert into rice fields a large swathe of traditional dry-season grazing land relied upon by pastoralists. Other concerns familiar to large-scale irrigation schemes – the impacts of fertilisers and pesticides, and the increased incidence of diseases such as malaria and bilharzia – do not seem to have been seriously considered. The ecological impact study by Ecosystems Ltd. (1985) strongly recommended re-assessment of the whole project concept, pointing out that there were more efficient ways of producing rice and much more appropriate ways of using the delta's resources than monopolising them for a single agricultural activity.

Environmental concerns do not seem to have been considered, either, in construction of the new, embanked road to Lamu across the floodplain near Garsen. Constructed without culverts (and presumably in the no-flood season!) it acts as a kind of dam, and has substantially altered flooding patterns. Land south of the road now receives no flood-water, while north of the road forest is drowned and dying (Robertson & Luke 1993, Ng'weno 1993).

The two major distributaries into the delta proper, the Furaha and Kalota Brooks, are now blocked by barrages constructed by the local people. The Furaha was cut off in the late 1970s and the Kalota in 1988, in both cases after a drought year. The Ozi rice scheme depends on natural irrigation from river water pushed back by the tidal bore at Kipini, and the lowered river volume in time of drought raised fears that the Tana might change its course once again, abandoning the Kipini mouth entirely. Even if this did not happen, it was thought that the outflow of fresh water to the distributaries might result in salt water flooding the fields (O. Nasirwa, *in litt.*). In any case, the barrages have converted the Kalota and Furaha into saline creeks, and profoundly altered the ecology of the southern delta. With their fresh water cut off, the riverine trees are dying, the mangroves are shifting up-stream, and hippos and crocodiles have been forced to move. The freshwater grasslands are becoming saline and unsuitable for grazing. A sluice system to allow agreed amounts of freshwater into this part of the delta would probably solve these problems fairly simply.

Who owns the delta, and who should control its resources? The Witu Settlement Scheme is sub-dividing and allocating land between Witu and Kipini, in the north-eastern part of the site. The landless in Lamu and Tana River Districts are yet to be given priority when the plots are issued (Robertson & Luke 1993). There has also been a long-running and acrimonious dispute over the section of the delta south of the river, fronting the coast. This area had been earmarked by Kenya Wildlife Service in 1988 as a wetlands reserve. In part, this was in recognition of the outstanding tourism potential of the area, which has superb scenic and wildlife interest, a remote feel and unspoiled landscapes and beaches (e.g. Cheffings 1987). A portion of 20,000 ha was allotted in 1990 to a group ranch, Kon-Dertu, made up of around 100 people living near the delta. Kon-Dertu, saying that it lacked the funds to develop the area, promptly sold half the allocation to Coastal Aquaculture Ltd., who intended to develop their piece as a commercial prawn farm. Prawn farms are notorious for their extremely negative environmental effects, and the allocation was hotly disputed by many concerned for the conservation of the delta. Almost a year's raging controversy culminated in an announcement by Kenya's President Moi in July 1993 that the Tana Delta should be protected as a wetland of international importance. The land allocation was

nullified, and a governmental Tana Delta Wetland Steering Committee set up to develop a management plan.

Five years later, progress towards this is minimal. An environmental awareness project has been carried out, which may have helped to defuse some of the strongly-held antipathy felt by the local community towards the Kenya Wildlife Service. A literature survey has been completed. However, there has been no headway on Ramsar designation, and no management plan has been begun. This is due to lack of funds and, more seriously, the continued absence of a consensus statement on land from the Ministry of Lands and Settlement (Becha 1997). Meanwhile, Coastal Aquaculture challenged the nullification of the land allocation in court and, in March 1996, won their case. Over a year later, the Government finally appealed for an injunction out of time against this ruling (Becha 1997).

The consensus statement is essential, because it will clarify the issue of land ownership and tenure, and help to settle unresolved questions of access, management responsibilities, environmental protection and sustainable use of resources. Without it, little progress is possible.

Meanwhile, in the continuing state of confusion, environmental degradation in this recently pristine habitat continues apace. Destruction of woodland and mangroves, slash-and-burn agriculture, illegal hunting of wildlife and unregulated off-shore trawling are all diminishing the delta's resources. More disturbingly, there are reports of allocations of large chunks of land to senior government officials and civic leaders from the district (Becha 1997). The Steering Committee itself seems impotent to act.

The local communities remain extremely hostile to the idea of their ancestral land being hived off as a wildlife reserve. Ironically, protection under the Ramsar Convention means something quite different to this. The Convention enshrines the idea of wise use – and central to this is that the needs of the local people must be met, in a sustainable way. The resources of the delta are bountiful enough that it can be managed in the interests of those who live there, while ensuring the long-term conservation of its birds and other biodiversity. The sooner the planning process begins, the better.

Further reading

Andrews *et al.* 1975, Ecosystems Ltd. 1985, Chelfings 1987, Coastal ASAL Development Project 1991, Njuguna 1992, 1993, Nkako 1992, Ng'weno 1993, Opala 1993, Robertson & Luke 1993, Becha 1997

23 Tana River Forests

2°30'S, 40°30'E, Coast Province, Tana River District

Area undefined: c. 60,000 ha, including 3,700 ha of forest

Altitude: 40–70 m

Status: Part National Reserve, part unprotected

Categories: Globally-threatened species, restricted-range species, East African Coast biome species

Site description

These are riparian forests along the meandering course of the lower Tana River, some 350 km east of Nairobi and 240 km north of Mombasa. Along the last 65 km of its course, the Tana has a broad floodplain, 1–6 km wide, that is covered by alluvial sediment deposited during floods. (Flooding takes place in response to heavy rains on the Aberdare Mountains (IBA 1) and Mt Kenya (IBA 3) watersheds rather than local rainfall in this hot, arid region.) These lowland evergreen forests are patchy, of different successional stages, and are dependent on groundwater supplied by the river. Characteristic trees include *Ficus* spp., *Phoenix reclinata*, *Acacia robusta*, *Populus ilicifolia*, *Bligbia unifugata*, *Sorindeia madagascariensis*, *Diospyros mespiliformis* and *Mimusops obtusifolia* (Robertson & Luke 1993). There are about 71 distinct forests, ranging in size from 1–1,100 ha and covering around 3,700 ha in total (Butynski & Mwangi 1995). They form part of a mosaic of habitats that includes grassland, wooded grassland, bushland and deciduous woodland. The forests lie on both banks of the Tana. Of the 71 patches, 16 (covering 1,000 ha) fall within the 17,100 ha Tana River Primate National Reserve (which extends for about 36 km along the river's present course), around 14 in the area managed by the Tana Delta Irrigation Project, and the remainder on Trust land (Seal *et al.*, 1991).

Birds

See box and Appendix 3 for key species. At least two globally-threatened bird species occur, along with at least two and possibly three of the species in the East

Globally-threatened species

Southern Banded Snake Eagle	Near-threatened	Probably fairly common
*Fischer's Turaco	Near-threatened	Fairly common in taller forest
Malindi Pipit	Near-threatened	In open grassland south of the Primate Reserve
East Coast Akalat	Vulnerable	Status unknown
*White-winged Apalis	Vulnerable	This is the only site for the nominate race *chariessa*, which may now be extinct: the last record was in 1961 (Zimmerman *et al.* 1996)
(*Tana River Cisticola	Data-deficient	This enigmatic species may occur in bushland in the National Reserve)
Basra Reed Warbler	Near-threatened	A non-breeding visitor, November to April; may be numerous on the lower Tana, in riverine thickets (Pearson *et al.* 1978)
Plain-backed Sunbird	Near-threatened	Probably fairly common in closed-canopy forest

**also restricted-range species*


23 Tana River Forests
Wenje
Wenje East (north)
Kipende
Wenje East (central)
Wenje East (south)
Maroni
Maroni East
Makere West
Guru North
Makere
Guru South
Mchelelo East
Mchelelo West
Sifa East
Congolani
Tana River
Primate Reserve
Sifa West
Baomo South
Baomo East
Mnazini North
Kitere
Mnazini South
Mnazini East
Matalani North
Mungaveni
Kinyadu East
Bubesa West 1
Matalani South
Kinyadu West
Bubesa East
Bubesa West 2
Mwina West
Unnamed Woodland
Sera
Mikamani
Peponi
Marembo East
Marembo West
Bvumbwe North-east
Sailoni 1
Giritu Woodland
Kulesa West
Kulesa East
Wema West
Wema East
Maziwa North
Hewani West
Maziwa South
Hewani East
Hewani South 1
Lake Bilisa
Hewani South 2
Garsen
0 5 10
Kilometres
Mitapani 1
Mitapani 2
N
Forest
River
Town/Village
National Reserve
Road
Approximate IBA Boundary

Regionally-threatened species

African Darter	Vulnerable	On river and lakes
Saddle-billed Stork	Vulnerable	On river and lakes
Ayres's Hawk Eagle	Vulnerable	Status unknown
African Crowned Eagle	Vulnerable	Status unknown
African Finfoot	Vulnerable	On wetlands with well-vegetated banks
Pel's Fishing Owl	Vulnerable	In forest along watercourses; a stronghold for this species in Kenya
Violet Wood-hoopoe	Vulnerable	In riverine woodland
Scaly Babbler	Vulnerable	In thicket vegetation
Little Yellow Flycatcher	Vulnerable	Probably fairly common in closed-canopy forest
Uluguru Violet-backed Sunbird	Vulnerable	Recent records from Kitere Forest (Butynski 1994)

African Coastal Forests Endemic Bird Area, and at least 19 of the 30 Kenyan species in the East African Coast biome. The threatened Spotted Ground Thrush has been recorded from Kipini, near the river's mouth (Britton 1980), but it is not known if it occurs in forests upstream. The avifauna holds some unusual species for coastal forest (notably White-winged Apalis, possibly extinct now, which is disjunct from the next known population in the Uluguru Mountains of Tanzania). Birdlife is abundant in the variety of habitats at the site, and the ox-bow lakes and riverbanks harbour a variety of waterbirds. The area is a stronghold for Pel's Fishing Owl, a species of regional concern.

Other wildlife

The fauna of these unique, remnant forests bears traces of ancient links to the Congo basin forests, during the Miocene period. They are the only home of two distinctive primates, the Tana River Red Colobus *Colobus badius rufomitratus* and Tana River Mangabey *Cercocebus galeritus galeritus*. The populations of these species have decreased considerably in recent years and both are seriously threatened (e.g. Medley *et al.* 1989, Seal *et al.* 1991, Butynski & Mwangi 1995). The highly threatened and restricted Hunter's Antelope or Hirola *Damaliscus hunteri* occurs in the bushland nearby. At least 61 plants are globally or nationally rare, and notable species include *Anisocycla blepharosepala*, an undescribed *Dichapetalum* sp. (sp. 1 of CFS), *Cynometra lukei*, *Cyphostemma ternatum*, *Synsepalum msolo*, *Tylophora stenoloba*, *Pavetta sphaerobotrys* ssp. *tanaica* and *Uncaria africana* (Robertson & Luke 1993). On sandy bars and banks in the river grows a poplar tree, *Populus ilicifolia*, endemic to the Northern Ewaso Ng'iro, Tana and Athi/Sabaki rivers.

Conservation issues

The riverine forests are also home to the Pokomo people, who farm the river banks. They use mainly the ox-bows, growing rice next to the water and maize further back. The forest is exploited by them for fuelwood, timber and traditional medicines. High rates of population growth have increased pressure on resources, and large areas of forest have been felled to make way for cultivation. Generally, forest use is thought to be unsustainable, with fire, pole-cutting and felling of large trees for canoes particular threats (Seal *et al.* 1991, Robertson & Luke 1993). Insecurity on the eastern bank of the river has helped protect the forests there, which are generally in better condition. Many important forests, and an estimated 63% of the colobus and 44% of the

mangabey populations, occur outside the reserve. These patches are generally under more immediate pressure than those within it.

A major GEF-funded project, which began in 1997, is addressing the issue of community use of the forests and their management for biodiversity conservation (Kiss 1993). This project will also enable additional surveys of the threatened birds. However, it will not tackle the other major potential threat to the forests: dams on the upper reaches of the Tana River. Five major dams (Kindaruma, Gitaru, Kiambere, Kamburu and Masinga (IBA 30)) already provide hydro-power and irrigation water. These impoundments substantially alter the natural flooding regime of the river, on which continued survival of the forests depends.

Recent concern has focused on the planned Mutonga–Grand Falls Hydropower Project (Butynski 1995). An environmental impact assessment of the original proposal suggested that the new dams at Mutonga and Grand Falls would greatly reduce river discharge, silt deposition and the level of groundwater. This would lead directly to the loss of the riverine forest and the species that it holds. However, following further debate, the present design of the Low Grand Falls dam incorporates an artificial flood and sediment release facility. This is intended to release sediments and artificial floods twice a year, around April and November. Mutonga Dam will also have sand-flushing facilities. Although this increases the costs, they are calculated to be offset by the environmental value (F. Ng'weno, *in litt.*). Construction is to begin in 2003, for commissioning in 2008. Before detailed design and tendering begins, an additional environmental assessment will measure flood patterns for at least two rainy seasons. At least in theory, the new dams will have the potential to mitigate not only their own impact but that of the five existing dams as well. However, who decides whether, when and how the artificial floods are released remains a contentious issue.

Further reading

Andrews *et al.* 1975, Marsh *et al.* 1975, Marsh 1986, Hughes 1982, 1987, 1990, Decker 1987, Medley *et al.* 1989, Medley 1990, 1993, 1995, Seal *et al.* 1991, Njue 1992, Kahumbu 1993, Davies & Kahumbu 1993, Robertson & Luke 1993, Butynski 1995, Butynski & Mwangi 1995, Mlingwa *et al.* in press

East Coast Akalat

24 Tsavo East National Park

03°22'S, 38°35'E, Coast Province, Tana River and Taita-Taveta Districts;
Eastern Province, Kitui District

1,175,000 ha

Altitude: 300–910 m

Status: National Park

Categories: Globally-threatened species,
Somali-Masai biome species

Site description

This vast savanna National Park lies in low, semi-arid country at the eastern edge of the inland plateau, north of the main Mombasa-Nairobi road and railway. Much of the park is level, open country, with scattered rocky outcrops. The Yatta Plateau, a long, flat-topped lava ridge, runs along the western boundary, and beneath it flows the Athi River; this joins the Tsavo River to become the Galana River, a permanent stream that cuts right across the Park. The seasonal Tiva and Voi Rivers are important features of the northern and southern sectors, respectively. Along the rivers is a narrow fringe of woodland and thicket, dominated by *Acacia elatior*, the Doum Palm *Hyphaene compressa* and the shrub *Suaeda monoica*. The northern part of the park is predominantly more-or-less dense *Acacia-Commiphora* woodland. South of the Galana, this has been opened out over the years by fire and elephants to form open bushed grassland. Common shrubs here include species of *Premna*, *Bauhinia* and *Sericocomopsis*, and scattered trees such as *Delonix elata* and *Melia volkensii*. The Yatta Plateau has a cover of dense bushland, with stands of Baobab *Adansonia digitata*. There are scattered seasonal pools, swamps and dams, but relatively few sources of permanent water. The vegetation is generally denser in the west, where rainfall is around 450 mm per year, than in the drier east, which may receive only around 250 mm.

Birds

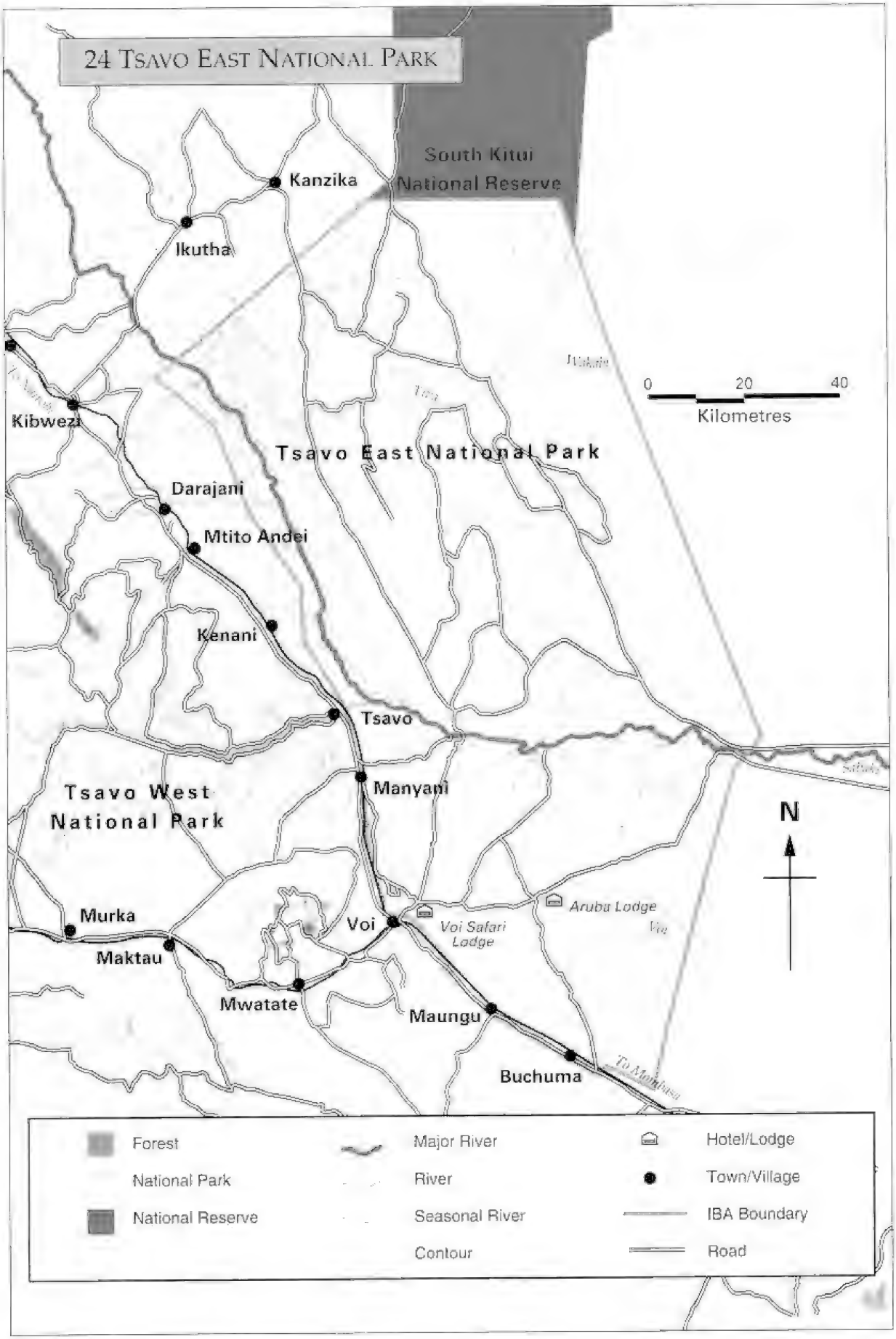
See box and Appendix 3 for key species. Sixty of the 92 Kenyan species in the Somali-Masai biome have been recorded. The enigmatic, near-threatened Friedmann's Lark probably nests here. The Park's huge area of natural habitat supports important populations of resident species, and it is also a very significant stop-over and wintering ground for Palaearctic migrants.

Other wildlife

The park holds substantial populations of a diversity of large mammals. Threatened species include African Elephant *Loxodonta africana* and Cheetah *Acinonyx jubatus*. Small herds of the critically endangered Hirola *Damaliscus hunteri* were translocated in the 1960s and again in 1996, from Arawale National Reserve, and are managing to sustain their numbers. Two amphibian taxa, *Afrixalus pygmaeus septentrionalis* and *Hyperolius sheldricki*, are endemic to the Tsavo area (Duff-MacKay 1980).

Globally-threatened species

Lesser Kestrel	Vulnerable	Regular but uncommon visitor to open areas, December–March (Lack *et al.* 1980)
Friedmann's Lark	Near-threatened	Probably breeds. Recorded singing and displaying in open bushed grassland near Voi Safari Lodge, 1976/77 (Lack 1977)
Basra Reed Warbler	Near-threatened	There is likely to be a substantial passage of this migrant from the Middle East, judging from birds ringed further south in Tsavo West National Park (IBA 25); some birds over-winter (Pearson 1997)


24 TSAVO EAST NATIONAL PARK
South Kitui
National Reserve
Kanzika
Ikutha
Kibwezi
Tsavo East National Park
Darajani
Mtito Andei
Kenani
Tsavo
Manyani
Tsavo West
National Park
Murka
Maktau
Voi
Voi Safari
Lodge
Aruba Lodge
Mwatate
Maungu
Buchuma
To Mombasa
0
20
40
Kilometres
N
Forest
National Park
National Reserve
Major River
River
Seasonal River
Contour
Hotel/Lodge
Town/Village
IBA Boundary
Road

Regionally-threatened species

African Darter	Vulnerable	Occasional visitor to dams
Great Egret	Vulnerable	Regular visitor, along rivers and on dams
Saddle-billed Stork	Vulnerable	Regular at waterholes and on Tiva River
White-headed Vulture	Vulnerable	Resident in small numbers
Martial Eagle	Vulnerable	Tsavo East is regarded as a stronghold of this species, although the total numbers may be small as home ranges cover a great area (Smeenk 1974)
African Finfoot	Vulnerable	Recorded along the Tsavo and Galana Rivers, where the banks are well vegetated
Violet Wood-hoopoe	Vulnerable	Uncommon in riverine woodland on the Galana and Tiva Rivers

Except where indicated, data from Lack et al. *(1980) and Zimmerman* et al. *(1996).*

Conservation issues

Wildlife poaching was a serious problem during the 1980s, when Black Rhinoceros *Diceros bicornis* were eliminated, but now appears to be under control. Tsavo East is large enough to form a fairly self-contained ecosystem. So long as it remains a National Park managed for wildlife, threats to its biodiversity are minimal.

Further reading

Bax 1963, Leuthold & Leuthold 1976, Lack *et al.* 1980, Lack 1983a & b, 1985

Vulturine Guineafowl

25 Tsavo West National Park

02°50'S, 38°10'E, Coast Province, Taita-Taveta Districts;
Eastern Province, Kitui District

906,500 ha

Altitude: 600–1,800 m

Status: National Park

Categories: Globally-threatened species, Somali-Masai biome species

Site description

Tsavo West National Park is a vast expanse of savanna stretching from the Athi River, north of the Mombasa-Nairobi road, south to the Tanzanian border. The north-eastern boundary along the Athi adjoins Tsavo East National Park (IBA 24), but Tsavo West has a more varied topography and a more diverse array of habitats than its neighbour. Most of the northern sector is *Acacia-Commiphora* bushland, with scattered trees such as Baobabs *Adansonia digitata* and *Delonix elata*. There are numerous rocky outcrops and ridges, and, towards the Chyulu Hills, ash cones and lava flows — some of them very recent. In the Ngulia area, a range of craggy hills reaches around 1,800 m and is heavily wooded. The southern sector consists of open grassy plains. The permanent Tsavo River runs through the northern part of the Park, with a fringe of riverine *Acacia elatior* and *Hyphaene compressa* woodland. In the far south-western corner on the Kenya-Tanzania border is Lake Jipe, part of which is in the Park. This very attractive lake is fed by run-off from Mt Kilimanjaro and the North Pare mountains. It is bordered by extensive beds of *Typha* and has large permanent swamps at its eastern and western ends. At Mzima Springs, in the north of the Park, water that has filtered underground from the Chyulu Hills gushes into a series of clear pools, rich in fishes and fringed by *Raphia farinifera* and *Phoenix reclinata* palms. Tsavo West houses one of Africa's premier bird ringing stations, Ngulia Safari Lodge, which is located on the edge of a dramatic escarpment at the foot of Mt Ngulia.

Birds

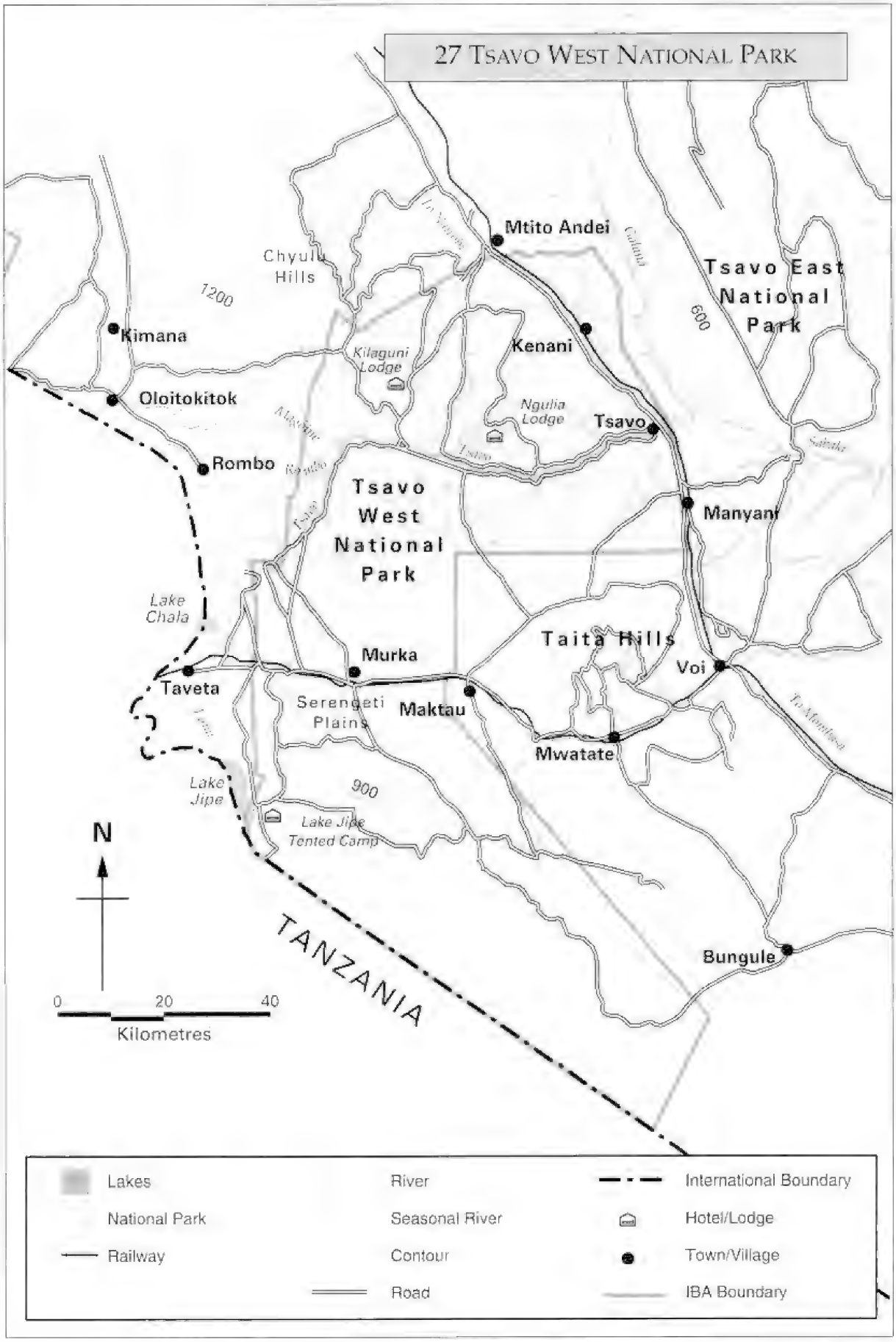
See box and Appendix 3 for key species. Tsavo West has a rich avifauna, including 55 of Kenya's 92 Somali-Masai biome species. The enigmatic, near-threatened Friedmann's Lark has been recorded singing and displaying in years of good rains, and presumably nests here. Tsavo West forms part of a corridor of natural habitat in eastern Kenya through which vast numbers of Palaearctic birds migrate, especially in November/December. These include the threatened Corncrake and near-threatened Basra Reed Warbler. Local weather conditions at Ngulia Safari Lodge are often such that thousands of migrating birds are attracted to the lodge's lights at night, and around 220,000 individuals have been ringed here since 1969. Lake Jipe supports an important heronry, where African Darter nests, among other species; this is situated a few kilometres outside the Park.

Other wildlife

Tsavo West is well known for its populations of large savannah mammals, particularly African Elephant *Loxodonta africana*. The Ngulia Rhino Sanctuary holds a number of Black Rhinoceros *Diceros bicornis*, and other threatened wildlife include Cheetah *Acinonyx jubatus* and Leopard *Panthera pardus*. The frog *Afrixalus pygmaeus septentrionalis* is known only

Globally-threatened species

Corncrake	Vulnerable	Palaearctic passage migrant, regularly caught at Ngulia Lodge (Zimmerman *et al.* 1996, Pearson 1996)
Basra Reed Warbler	Near-threatened	Regularly ringed at Ngulia (Backhurst 1996), and a number of birds may over-winter (Pearson 1997)
Friedmann's Lark	Near-threatened	Probably nests in years of good rains (Pearson *et al.* 1992, LAB unpubl. data)


27 TSAVO WEST NATIONAL PARK
Mtito Andei
Chyulu Hills
1200
Kimana
Kilaguni Lodge
Kenani
Tsavo East National Park
600
Oloitokitok
Ngulia Lodge
Tsavo
Rombo
Tsavo West National Park
Manyani
Lake Chala
Taita Hills
Murka
Voi
Taveta
Serengeti Plains
Maktau
Mwatate
Lake Jipe
900
Lake Jipe Tented Camp
N
TANZANIA
Bungule
0
20
40
Kilometres
Lakes
National Park
Railway
River
Seasonal River
Contour
Road
International Boundary
Hotel/Lodge
Town/Village
IBA Boundary

Regionally-threatened species

Common Ostrich	Vulnerable	Common within the Park
Great Egret	Vulnerable	Small numbers occur at Lake Jipe and Mzima Springs
African Darter	Vulnerable	Small numbers occur at Lake Jipe (where they have nested) and Mzima Springs
White-headed Vulture	Vulnerable	Resident in small numbers
Martial Eagle	Vulnerable	Resident in small numbers
Blue Quail	Vulnerable	Uncommon intra-African migrant
African Finfoot	Vulnerable	Uncommon on Tsavo River, where there is thick fringing vegetation
Violet Wood-hoopoe	Vulnerable	Local and uncommon in riverine woodland
Yellow-billed Oxpecker	Vulnerable	Fairly common in extreme south

From Zimmerman et al. *(1996) and unpubl. data*

from the area between Mtito Andei and Voi, but is not considered under threat (Duff-MacKay 1980).

Conservation issues

The Park faces no major threats at present. The remarkable phenomenon of night-time bird migration over Ngulia Safari Lodge is an eco-tourist attraction that is presently little appreciated. This long-term ringing programme has enormous scientific value, and its importance should be better recognised by the Park administration.

White-headed Buffalo Weaver

Further reading

Pearson & Backhurst 1976,
Backhurst & Pearson 1977a,b,
1979, 1980, 1981, 1983a,b, 1984,
Jensen & Belsky 1989,
Backhurst 1996,
Pearson 1996,
Richards 1996

26 Chyulu Hills Forests

02°35'S, 37°50'E, Eastern Province, Makueni District and Rift Valley Province, Kajiado District

18,000 ha (c. 7,900 ha forest)

Altitude: c. 1,500–2,160 m

Status: National Park and (ungazetted) Game Conservation Area

Categories: Globally-threatened species, restricted-range species

Site description

The Chyulu Hills are situated 190 km south-east of Nairobi and 30 km south-west of Kibwezi. They are of relatively recent volcanic origin, and the range is composed of ash cones and craters. The hills hold no permanent surface water, but rainfall percolating through the porous rock feeds many permanent fresh water sources in the surrounding plains, notably Mzima Springs and the Tsavo and Galana Rivers. The hills are relatively undisturbed and still shelter indigenous vegetation and wildlife. Rough grassland and thicket give way to patches of montane forest along the spine of the hills, mainly above the 1,800 m contour; the largest tract of forest is around the highest peaks in the central-southern portion. Characteristic trees include *Ficus* spp., *Neoboutonia macrocalyx*, *Tabernaemontana stapfiana*, *Prunus africana*, *Strombosia scheffleri*, *Cassipourea malosana*, *Olea capensis* and *Ilex mitis*, with islands guarded by *Erythrina abyssinica* (Q. Luke, *in litt.*) Lower down, there are areas of *Juniperus procera* forest and, particularly on lava flows, forest dominated by the blue-stemmed *Commiphora baluensis*. The eastern flank of the hills, including about half the forest area, is in the 47,100 ha Chyulu East National Park, administered by Kenya Wildlife Service. The park boundary runs down the centre of the hills along the line of the peaks. The western half is part of the ungazetted West Chyulu Game Conservation Area, owned by several Maasai group ranches. At present, this area has no formal conservation status. The notional boundary of the IBA follows the 1,500 m contour, including an area of some 18,000 ha of which around half is included in the Park and slightly under half is forested.

Birds

See box for key species. The Chyulu Hills may be an important stopping-point for Abbott's Starlings as they move between forests on Mt Kilimanjaro and the central Kenyan highlands. The hills hold endemic races of Shelley's Francolin (*macarthuri*), White-starred Robin (*macarthuri*) and Orange Ground Thrush (*chyulu*). The race *chyulu* of the Cinnamon Bracken Warbler is now generally merged with the race *rufoflavidus* of northern Tanzania, but Chyulu birds are darker (D. A. Turner, *in litt.*). Van Someren (1939) named 22 further Chyulu Hills sub-species, most of which are no longer considered valid, but definitive taxonomic work remains to be done.

Other wildlife

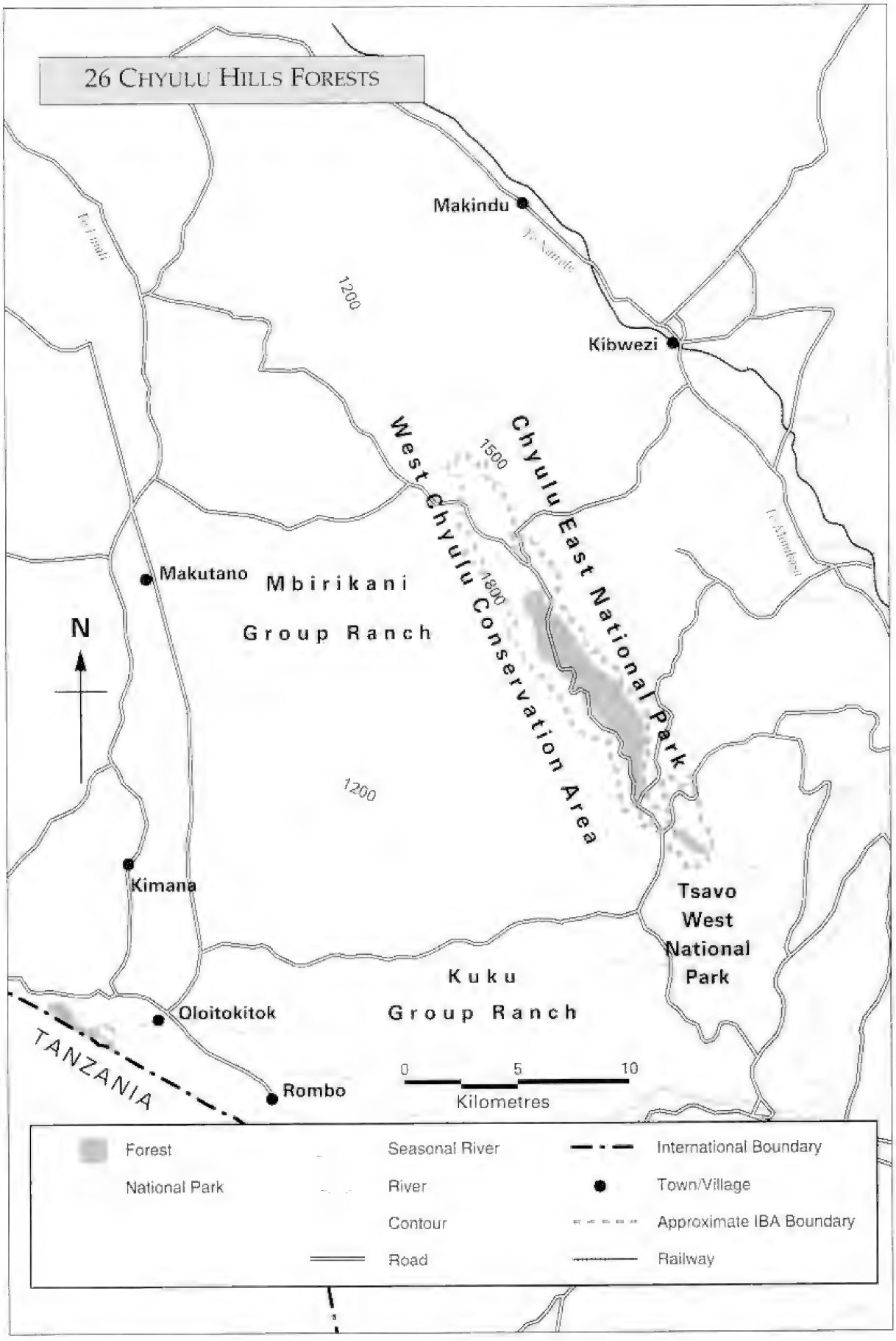
A variety of large mammals occurs on Chyulu (Q. Luke *in litt.*), including African Buffalo *Syncerus caffer*, Common Eland *Taurotragus oryx*, Bushbuck *Tragelaphus scriptus*, Mountain Reedbuck *Redunca fulvorufula*, Steinbok *Rhapicerus campestris*, Bushpig *Potamochoerus porcus*, Leopard *Panthera pardus* and, at times, African Elephant *Loxodonta africana*. The rich butterfly life includes the endemics *Pentila tropicalis chyulu*, *Acraea anacreon chyulu*, *Papilio desmondi desmondi* and the near-endemic *Amauris echeria chyuluensis* (Larsen 1991, Q. Luke, *in litt.*).

Ongoing research on the vegetation (Luke, in prep.) gives some 550 taxa, excluding the numerous

Globally-threatened species

*Abbott's Starling	Vulnerable	In the forest canopy, at times in large flocks; probably a seasonal visitor when forest trees are in fruit (van Someren 1939, Turner 1977, OS-c 1983a)

**also restricted-range species*


26 Chyulu Hills Forests
Makindu
Kibwezi
1200
1500
1800
West Chyulu Conservation Area
Chyulu East National Park
Makutano
Mbirikani
Group Ranch
N
1200
Kimana
Tsavo
West
National
Park
Kuku
Group Ranch
Oloitokitok
TANZANIA
Rombo
0
5
10
Kilometres
Forest
National Park
Seasonal River
River
Contour
Road
International Boundary
Town/Village
Approximate IBA Boundary
Railway

Regionally-threatened species

Ayres's Hawk-Eagle	Vulnerable	Status unknown
African Crowned Eagle	Vulnerable	Status unknown
Martial Eagle	Vulnerable	On the lower slopes, outside forest

grasses. Amongst these are 37 species of orchids, mostly epiphytes supported by the heavy mists and the rare saprophyte *Epipogium roseum*. Notable trees are *Chionanthus mildbraedii* and the most northerly population of *Podocarpus usambarensis*.

Conservation issues

The lower eastern slopes of the hills were occupied in the past by agricultural settlers, who were displaced in 1988 to make way for the National Park. This has led to lingering resentment among those evicted, and difficulties in policing use of the park. There have been particular problems with forest burning and cutting to encourage sprouting of 'miraa', *Catha edulis*, a valuable tree whose young shoots are used as a stimulant in parts of Kenya and Somalia. 'Miraa' harvesting could well be sustainable if properly managed, but National Park regulations do not allow for it to be extracted legally. The hills provide wet-season grazing for Maasai pastoralists from the nearby group ranches. Regular burning of the grassland is also caused by meat poachers either driving game into snare lines or using the resultant new grass as bait (Q. Luke, *in litt.*). It is debatable how destructive these annual grass fires are to the forests, quite possibly protecting them in the long run by ensuring that flammable brush and litter do not build up to dangerous levels. The hills have great potential for eco-tourism, but difficulties of access and the lack of surface water have kept this on a limited scale so far. Chyulu Lodge, on the north-west slopes, caters for visitors interested in walking or horse-riding in the hills, or bird-shooting on the plains below.

There has been little ornithological work in Chyulu since an East Africa Natural History Society expedition in the 1930s (van Someren 1939). A bird conservation survey of the forests is overdue. It should focus on the status and requirements of Abbott's Starling and the endemic sub-species of robin and thrush.

Further reading

van Someren 1939

White-starred Robin

27 Dida Galgalu Desert

02°40'N, 38°05'E, Eastern Province, Marsabit District

Area undefined

Altitude: 600–800 m

Status: Unprotected

Categories: Globally-threatened species, restricted-range species, Somali-Masai biome species

Site description

A vast expanse of arid, inhospitable black lava desert, stretching from around 20 km north of Marsabit town for at least 60 km on either side of the main Marsabit-Moyale road. The distributional limits of the special birds, and therefore the limits of the IBA, are unknown. Rainfall is erratic and unpredictable, averaging less than 200 mm per year. The area is inhabited by the nomadic Gabbra people, but there are no permanent settlements in this harsh, waterless terrain. The desert's southern fringe is just within the Marsabit National Reserve, but it is otherwise unprotected.

Birds

See box and Appendix 3 for key species. This appears to be the stronghold of the enigmatic, near-threatened, restricted-range Williams's Lark, and most recent records have been from this area. Other notable species include Heuglin's Bustard, Somali Bee-eater, Masked Lark (probably the largest population in Kenya: D.A. Turner, *in litt.*), Thekla Lark, Chestnut-headed Sparrow-lark and (on the northern fringes) White-crowned Starling. Some 44 out of Kenya's 92 Somali-Masai biome species occur in the general area of Marsabit (and are listed in Appendix 1), but it is not known how many are present in the desert itself.

Other wildlife

No information is available.

Conservation issues

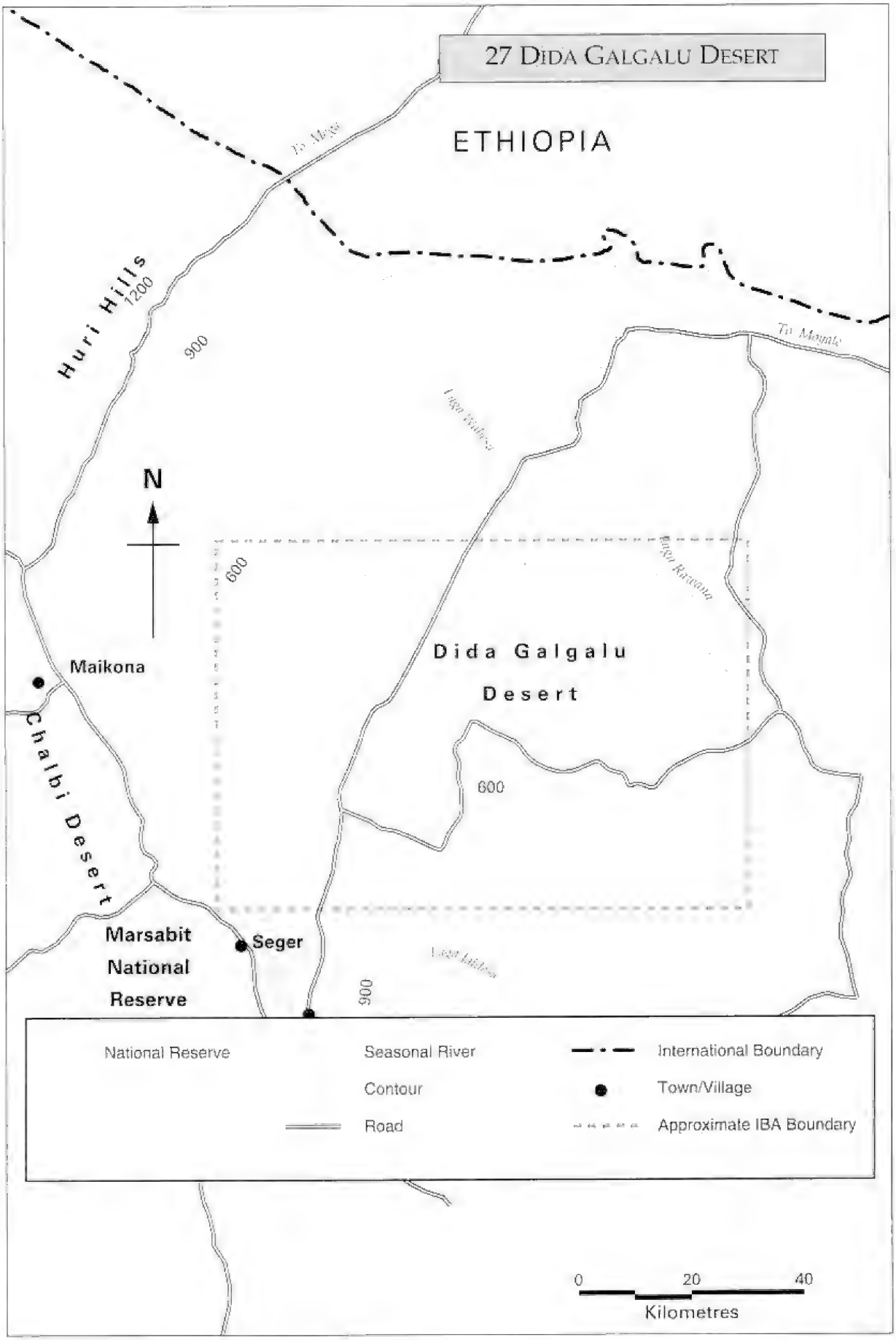
Little information is available, but this habitat is unlikely to be under threat. Very little is known about Williams's Lark, and an ecological survey of this species would yield useful information. The lark should also be looked for on the slopes of Mt Marsabit, the type locality; if a viable population is present there, the National Park could be incorporated into the IBA.

Star-spotted Nightjar

Globally-threatened species

*Williams's Lark	Near-threatened	Locally common but inconspicuous in rocky lava desert with sparse grass and low *Barleria* shrubs (Zimmerman *et al.* 1996, Turner 1998)

**also restricted-range species*


27 DIDA GALGALU DESERT
ETHIOPIA
To Moyale
To Moyale
Huri Hills
1200
900
N
600
Dida Galgalu
Desert
600
Maikona
Chalbi Desert
Marsabit
National
Reserve
Seger
900
National Reserve
Seasonal River
Contour
Road
International Boundary
Town/Village
Approximate IBA Boundary
0
20
40
Kilometres

28 Lake Turkana

2°27'N, 36°04'E, Eastern & Rift Valley Provinces, Marsabit and Turkana Districts

756,000 ha

Altitude: 355 m

Status: Mainly unprotected; two islands and c. 13% of shoreline are National Parks

Category: Somali–Masai biome species, congregations

Site description

A very large, isolated, chloro-carbonate alkaline lake, the northernmost and by far the largest of the chain of Rift Valley lakes in Kenya. The Omo River delta at the extreme northern end of the lake lies within Ethiopia. Turkana's water is brackish, with a pH of 9.5–9.7, but drinkable, and the lake holds freshwater fish. The 600 km or so of lake shore vary greatly in substrate, from rock (most of the southern sector, the central eastern shore, and North, Central and South Islands) to pebble, sand (most of the north-western shore, and patches elsewhere) and mud (at Loiyengalani, El Molo and Allia Bays, the Omo delta and the inlets of the Turkwel and Kerio Rivers). Beds of the submerged plant *Potamogeton pectinatus* occur in the most sheltered muddy bays. The country surrounding the lake is semi-desert with sparse vegetation: annual rainfall averages less than 250 mm (substantially less in some places), and it may not rain for several years at a stretch. South and Central Islands are National Parks, and part of the north-east shore is protected within Sibiloi National Park.

Birds

See box for key species. Turkana is an extremely important waterbird site: 84 waterbird species, including 34 Palaearctic migrants, have been recorded here (Bennun & Fasola 1996). Over 100,000 Little Stints may winter, representing more than 10% of the entire East African/South East Asian wintering population (cf. Rose & Scott 1997). As well as supporting many wintering Palaearctic migrants, the lake is a key stop-over site for birds on passage. Waterbirds are distributed all around the lake, but the highest densities are on mud and pebble shores; particular concentrations occur in sheltered muddy bays and the Omo delta (Bennun & Fasola 1996). At least 23 species breed here, including Goliath Heron, and up to 50 pairs of African Skimmer have bred on Central Island (Lewis & Pomeroy 1989). Thirty-four of Kenya's 92 Somali-Masai biome species occur, including Somali Sparrow, which is not listed for any other IBA. Fox Kestrel (of the Sudan & Guinea Savannah biome) also occurs here but at no other IBA in Kenya.

Congregations

More than 20,000 waterbirds	220,000
1% or more of biogeographical population	
Pink-backed Pelican (1,000)	1,060
Greater Flamingo (1,250)	2,580
Spur-winged Plover (5,000)	6,930
Ringed Plover (3,000)	13,600
Caspian Plover (200)	500
Kittlitz's Plover (1,000)	8,600
Little Stint (10,000)	113,000

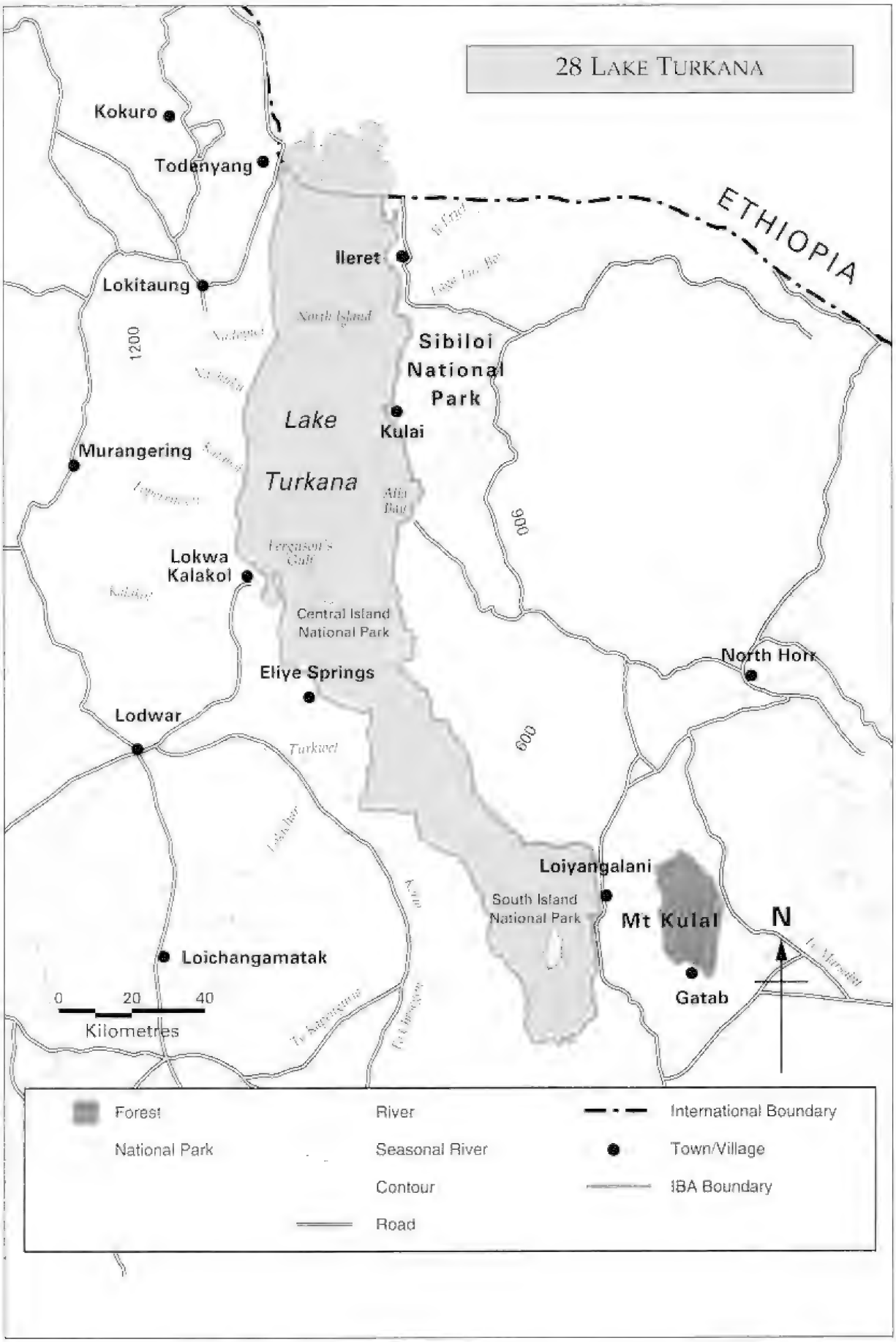
Estimates from aerial counts in February 1992 (Fasola et al. *1993b, Bennun & Fasola 1996)*

Other wildlife

Lake Turkana is rich in fish, with 47 species, seven of which are endemic. The sheltered muddy bays with beds of *Potamogeton* are important for fish spawning. The fish in turn support a large population (estimated at some 14,000 in 1968) of Nile Crocodile *Crocodylus niloticus*.

Conservation issues

Most of the lake has no formal protection, and in this wild and remote area the protection given by National Park status is largely nominal. Fortunately, direct human pressure on the lake is relatively low. Turkana's water level has been dropping steadily for many years (a decrease of 10 m was recorded between 1975 and 1992), mainly due to reduced inflow from the Omo River that supplies 90% of the lake's water. The Omo flows from the Ethiopian Highlands, where its flow has been diminished by irrigation projects and the effects of prolonged drought. Important Kenyan inflows, such as the Turkwel, have also been substantially reduced in recent years by hydro-power and irrigation schemes. Some islands that supported nesting waterbirds are now joined to the mainland and have been overrun by goats. Disturbance by fishermen seems to be a general problem for the island-nesting birds (Davey


28 LAKE TURKANA
Kokuro
Todenyang
ETHIOPIA
Ileret
Lokitaung
North Island
1200
Sibiloi
National
Park
Lake
Turkana
Kulai
Murangering
Allia
Bay
900
Lokwa
Kalakol
Central Island
National Park
North Horr
Eliye Springs
Lodwar
600
Turkwel
Loiyangalani
South Island
National Park
Mt Kulal
N
Loichangamatak
Gatab
0
20
40
Kilometres
Forest
National Park
River
Seasonal River
Contour
Road
International Boundary
Town/Village
IBA Boundary

Regionally-threatened species

Great Egret	Vulnerable	Occurs in small numbers; 60 estimated in February 1992 (Fasola *et al.* 1993b)
Saddle-billed Stork	Vulnerable	Nine estimated in February 1992 (Fasola *et al.* 1993b)
Banded Snake Eagle	Vulnerable	In riverine thickets (Lewis & Pomeroy 1989)
African Skimmer	Vulnerable	Up to 50 pairs once nested on Central Island, but have now shifted to less disturbed localities (Lewis & Pomeroy 1989)

1982); in particular, fishermen's camps on Central Island have forced the African Skimmers that nested there to shift elsewhere (Lewis & Pomeroy 1989), and the present status of this breeding colony is unclear. Pressure on the fish populations is increasing, although attempts to institute industrial-scale fishing projects have failed. Some bird species, particularly gulls, may benefit from the upsurge in fishing and fish-drying. Human populations around the lake are becoming more sedentary; consequent overgrazing by livestock causes deterioration of the lakeshore vegetation, and erosion of soils in the very strong winds that characterise this area.

Further reading

Hopson 1982, Schekkerman & van Wetten 1987, Fasola *et al.* 1993a,b, Benmun & Fasola 1996

Little Stint

29 Machakos Valleys

1°35'S, 37°14'E, Eastern Province, Machakos District

Area undefined: at least 5,000 ha

Altitude: 1,300–1,600 m

Status: Unprotected, private land

Categories: Globally-threatened species, restricted-range species

Site description

River and stream valleys in the catchment of the Ikiwe and Ngwani Rivers, south of Machakos town, draining eastwards into the Athi River system. The land slopes gradually down from the Athi-Kapiti plains in the west, with an intricate system of river valleys draining between small hills. The area is semi-arid rangeland, with rainfall around 500–700 mm per year, and with low potential for agriculture. Most of the streams and rivers are seasonal, with shallow valleys. The riverbeds consist of sand and rock, with a dense band of bush and thicket for about 10 m on either side, grading into open *Acacia xanthophloea* woodland. The land is owned by a number of large ranches, including Potha, Kilima and Kimutwa, some of which have been divided up into small agricultural plots. The boundaries of the IBA are presently undefined, requiring further survey work; it includes sections of the Ikiwe, Kimutwa, Love, Makilu, Mwania, Potha, Syuuni, Wamua and Wamui Rivers.

Northern Pied Babbler

Birds

The riverine thickets and woodland shelter the globally-threatened Hinde's Babbler, which has a very restricted range in central Kenya. This is one of the few sites where it is known to occur in natural habitat, although at relatively low densities. The babblers are commonest in the higher parts of the IBA, and are likely to occur in river valleys immediately to the south as well. The rest of the avifauna is characteristic of semi-arid areas in Kenya, with 18 species from the Somali-Masai biome.

Other wildlife

No information is available.

Conservation issues

The area is mainly ranchland, but (as in other marginal land in Kenya) agriculture is increasing, with attendant destruction of habitat. Of particular concern is the sub-division of large ranches into small parcels of land that are then cleared of all natural vegetation. The riverine woodland and thickets are particularly vulnerable. Because of the babblers' low densities, which imply large home ranges (around 4 km^2 for each group), even moderate habitat loss might lead to serious population declines (contrast the situation in the higher rainfall areas of Kianyaga and Mukurweini, IBAs 2 and 6). Subsistence hunting is also likely to be a threat to the babblers in this area. More survey work is needed to establish the extent of distribution of the babblers in this area, to investigate land holdings and land tenure, and to establish what conservation measures may be feasible.

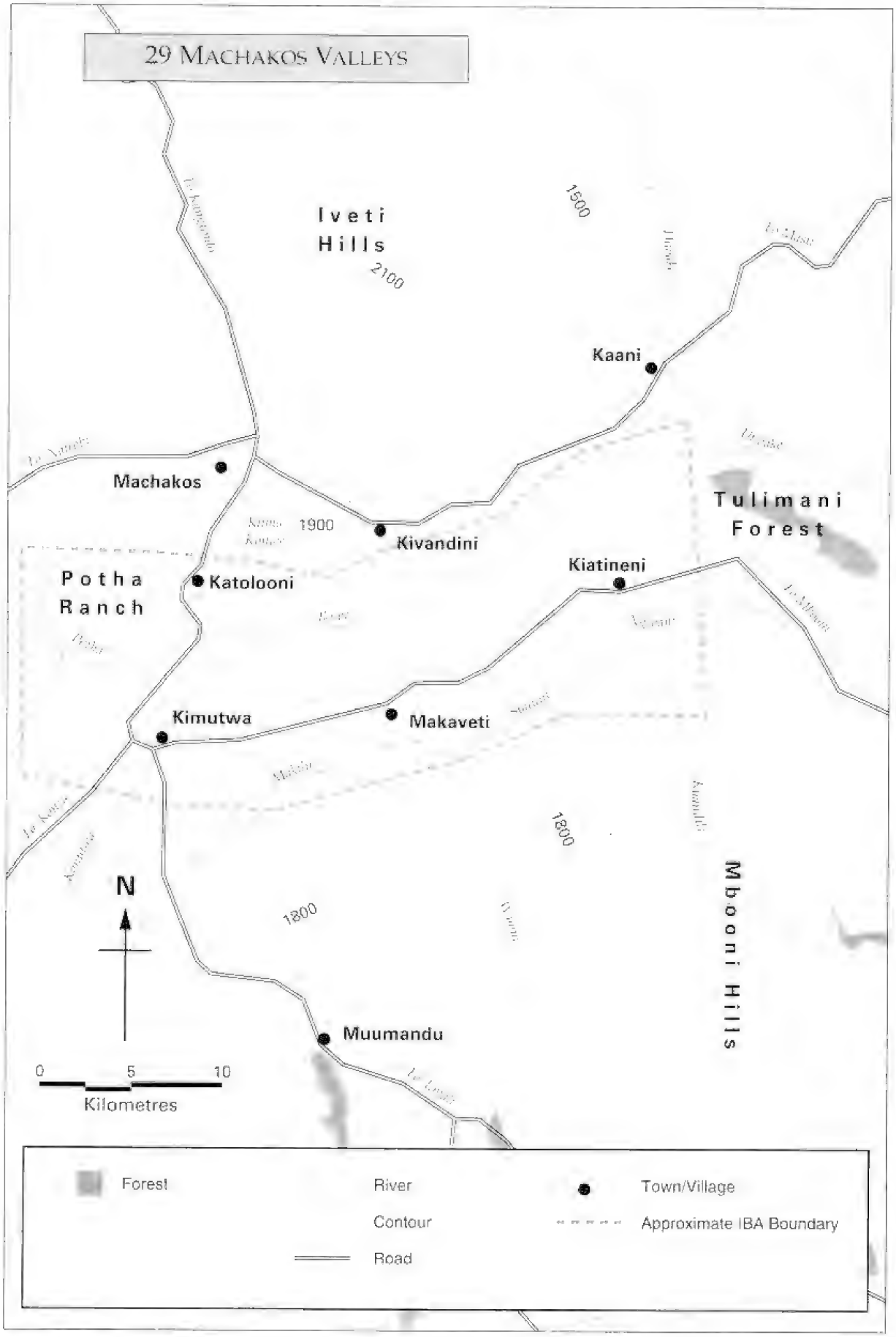
Further reading

Njoroge & Bennun, in press

Globally-threatened species

*Hinde's Babbler	Endangered	Recent records but at relatively low densities (c. 0.8 birds and 0.24 groups per km^2; Njoroge & Bennun, in press)

*also restricted-range species


29 MACHAKOS VALLEYS
Iveti Hills
2100
1500
Kaani
Machakos
1900
Kivandini
Tulimani Forest
Potha Ranch
Katolooni
Kiatineni
Kimutwa
Makaveti
1800
1800
Mbooni Hills
Muumandu
N
0 5 10
Kilometres
Forest
River
Contour
Road
Town/Village
Approximate IBA Boundary

30 Masinga Reservoir

0°49'S, 37°46'E, Eastern Province, Embu District *(see map in site account 32)*

c. 16,000 ha

Altitude: 1,050 m

Status: State owned

Category: Congregations

Site description

This is by far the largest reservoir of the five impoundments along the upper Tana River, and abuts on the east side with Mwea National Reserve (IBA 32). Masinga dam, which is managed by the Tana and Athi Rivers Development Authority, was completed in 1981. The valley that it drowned has a highly convoluted shoreline and contains a number of sizeable islands. The maximum depth is approximately 50 m, near the dam wall. Because of periodic draw-down and flooding, the shoreline is bare ground with a mosaic of deposited silt, pebbles and mud. Further from the water, a narrow strip of grass gives way to open *Acacia–Commiphora* bushland. The area is semi-arid with an annual rainfall of between 250 and 500 mm.

Birds

See box for key species. Masinga is notable mainly for its waterbirds, with breeding colonies of cormorants and African Darters. The terrestrial avifauna is not particularly diverse, but the threatened and restricted-range Hinde's Babbler has been recorded in *Acacia* thickets 100–200 m from the eastern shores of the reservoir (C. Jackson, *in litt.*) (and see Mwea National Reserve, IBA 32).

Great Cormorant

Other wildlife

The dam supports substantial populations of Hippopotamus *Hippopotamus amphibius* and Nile Crocodile *Crocodylus niloticus*. There is no information on other fauna or flora.

Conservation issues

Subsistence fishing is widespread in the dam, and poorly regulated. Gill-net fishing is a major threat to diving birds, particularly the African Darter — the 1995 survey found three that had been entangled in fishermen's nets (Nasirwa *et al.* 1995b). The dam was built in part to provide irrigation water for agriculture, but poor land-use in cultivated areas nearby is leading to siltation and eutrophication from fertiliser run-off. The waterbird nesting colonies need regular monitoring, and any conservation plan for the African Darter should focus on Masinga as a key site.

Further reading

Nasirwa *et al.* 1995a, b

Congregations

More than 20,000 waterbirds	27,900
1% or more of biogeographical population	
Great Cormorant (1,000)	2,150
White-winged Tern (2,000)	2,120

Data from March 1995 survey (Nasirwa et al. *1995a)*

Regionally-threatened species

African Darter	Vulnerable	80 counted in March 1995 (with 360 altogether on the five Upper Tana dams). Masinga is one of the few known Kenyan nesting sites
Great Egret	Vulnerable	The count of 260 in March 1995 (Nasirwa *et al.* 1995a) is notable
Martial Eagle	Vulnerable	Status unknown

31 Meru National park

0°18′S, 38°25′E

87,000 ha

Altitude: 370–910 m

Status: National Park

Category: Somali-Masai biome species

Site description

Meru is a savanna National Park, 85 km east of Meru town in the north-eastern lowlands below the Nyambeni hills. The wetter north-western sector (rainfall c. 700 mm per year) is hilly, with rich volcanic soils. The land flattens towards the east, where grey alluvial volcanic soils appear. This area is crossed by numerous permanent streams, draining from the Nyambenis and flowing in parallel between tongues of lava, south-eastwards towards the Tana River. There are several prominent inselbergs of basement rock, notably Mughwango and Leopard Rock. The vegetation on the ridges is *Combretum* wooded grassland, dominated by *Combretum apiculatum* (Ament 1975). This grades into *Acacia* wooded grassland to the east, with *Acacia lortilis* and *A. senegal* on the rocky ridges, in riverine thickets and dotted over open country, and Doum Palms *Hyphaene coriacea* in the numerous swampy areas near the rivers. *Chloris gayana* is the dominant grass in many places, with *Cyperus* species in the swamps.

The south and south-east (rainfall c. 300 mm per year) is an open, semi-arid plain with red lateritic soil. This area is covered with rather uniform *Acacia-Commiphora* bushland, a hot, dense, thorny and inhospitable habitat.

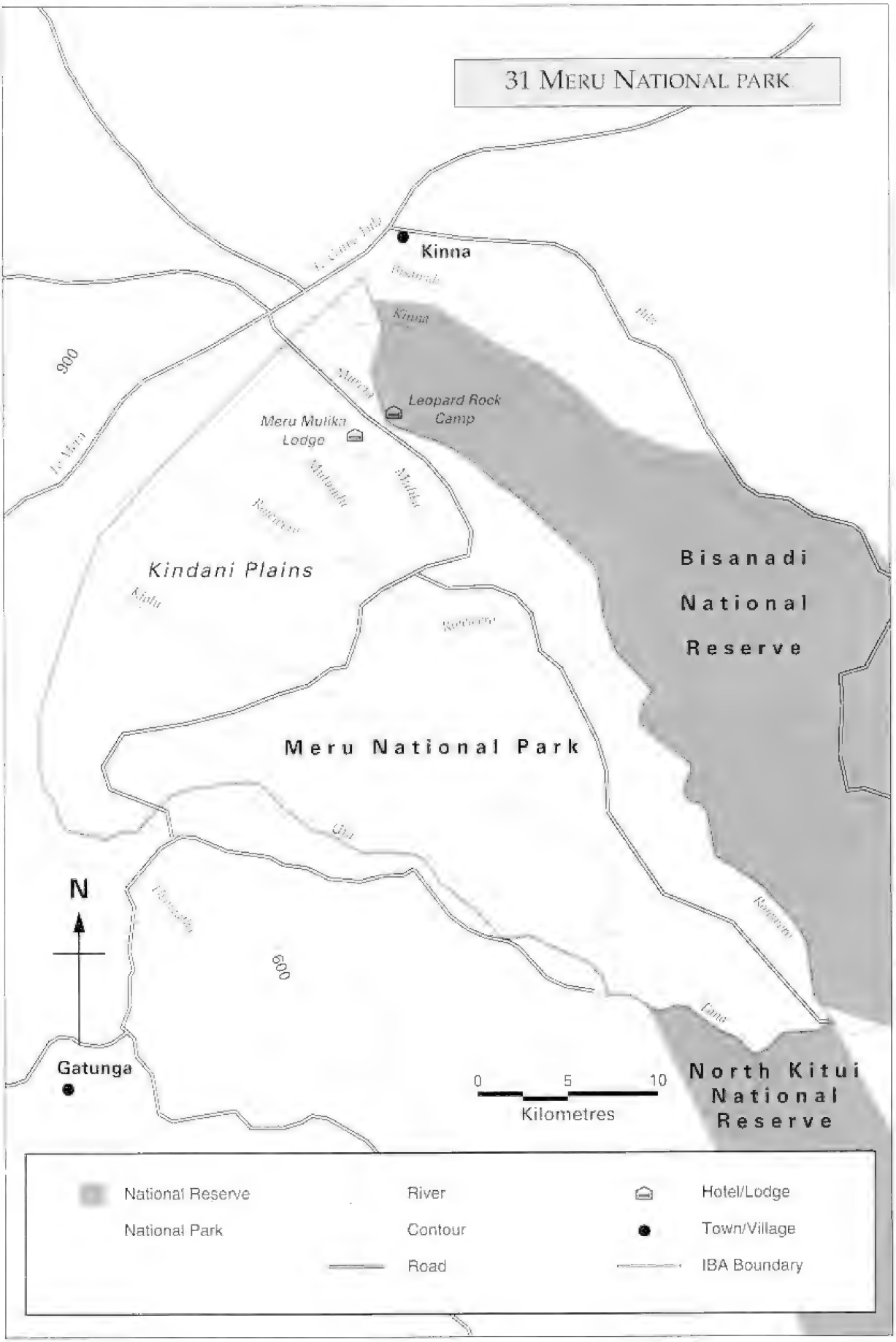
As well as the many streams that cross it, the Park is bounded by three large rivers: the Tana to the south, the Ura to the south-west and the Rojeweru to the east. Riverine trees include the palms *Raphia farinifera* and *Phoenix*

Eastern Yellow-billed Hornbill

Regionally-threatened species

Saddle-billed Stork	Vulnerable	Is known to breed (Zimmerman *et al.* 1996)
Martial Eagle	Vulnerable	Status unknown
African Finfoot	Vulnerable	Recorded from rivers with thick fringing vegetation (Williams 1967, Dougherty 1994)
Pel's Fishing Owl	Vulnerable	In dense riverine forest
Violet Wood-hoopoe	Vulnerable	In riverine forest and woodland

31 Meru National Park



reclinata, *Ficus sycomorus*, *Newtonia hildebrandtii*, *Acacia elatior* and *A. robusta*. Along the Tana River is found the Tana River Poplar *Populus ilicifolia*.

Meru is part of a complex of protected areas along the Tana River that includes the adjacent Bisanadi and North Kitui National Reserves (to the east and south, respectively), Kora National Park and Rahole National Reserve. These areas are better protected on paper than on the ground, however, and their birdlife (though generally little known) appears less rich than Meru's.

Birds

Fifty-seven Somali-Masai biome species occur out of the 92 recorded in Kenya (Appendix 3). The park's avifauna is generally diverse, with around 280 species recorded. Species of regional concern are shown in the box.

Other wildlife

The park holds good populations of large mammals, including the threatened African Elephant *Loxodonta africana*, Cheetah *Acinonyx jubatus* and Grevy's Zebra *Equus grevyi* (which is now practically confined to Kenya). Black Rhinoceros *Diceros bicornis* and the introduced Square-lipped or White Rhinoceros *Ceratotherium simum* have been eliminated by poachers.

Conservation issues

Like other National Parks, Meru is protected by the Kenya Wildlife Service. An electric fence has been erected along part of the western boundary, to prevent animals moving into farmland. One section of the park has been designated as a wilderness area with no developed access roads. Meru has much to attract the visitor, and was a popular tourist destination in the past, but insecurity and poaching (now both under control), poor access roads and dilapidation of facilities have caused visitor numbers to decline. Encroachment by pastoralists remains a problem, but in general this site faces few immediate conservation threats.

Further reading

Ament 1975, Dougherty 1994

Rosy-patched Bush-shrike

32 Mwea National Reserve

0°50'S, 37°40'E, Eastern Province, Mbeere District

4,200 ha

Altitude: 1000–1,100 m

Status: National Reserve

Categories: Globally-threatened species, restricted-range species

Site description

Mwea National Reserve contains gently rolling *Acacia–Commiphora* bushland on the north shore of the Kamburu Reservoir, at the confluence of the Tana and Thiba Rivers, 100 km north-west of Nairobi. This small Reserve lies just east of Masinga Reservoir (IBA 32). Within its borders are 700 ha (including two small islands) of the 1,500 ha Kamburu Dam. The Reserve was created in 1975 as a wildlife sanctuary, and is owned by the Mbeere County Council (pending District confirmation) and managed by the Kenya Wildlife Service. The area is semi-arid with an annual rainfall of between 250 and 500 mm. Thick bush and scattered trees, including Baobab *Adansonia digitata*, line the waterfront, thinning out to open glades further up the slope. Richer scrub and woodland line seasonal rivers and streams. The Reserve is essentially undeveloped. There is a campsite and around 95 km of rough roads, but no accommodation.

Birds

See box for key species. This is the only protected area in which the globally threatened Hinde's Babbler, a restricted-range Kenya endemic, is known to occur. Populations of the babbler have not been assessed. This is also a rich locality for birds generally, especially birds of prey, and is close to the Mwea rice growing area which attracts a large number of waterbirds and waders. Mwea holds at least 14 of Kenya's 92 Somali-Masai biome species, and more are likely to be added in future. Two species rarely recorded in Kenya, Pel's Fishing Owl and White-backed Night Heron, occur here in riverine woodland.

Other wildlife

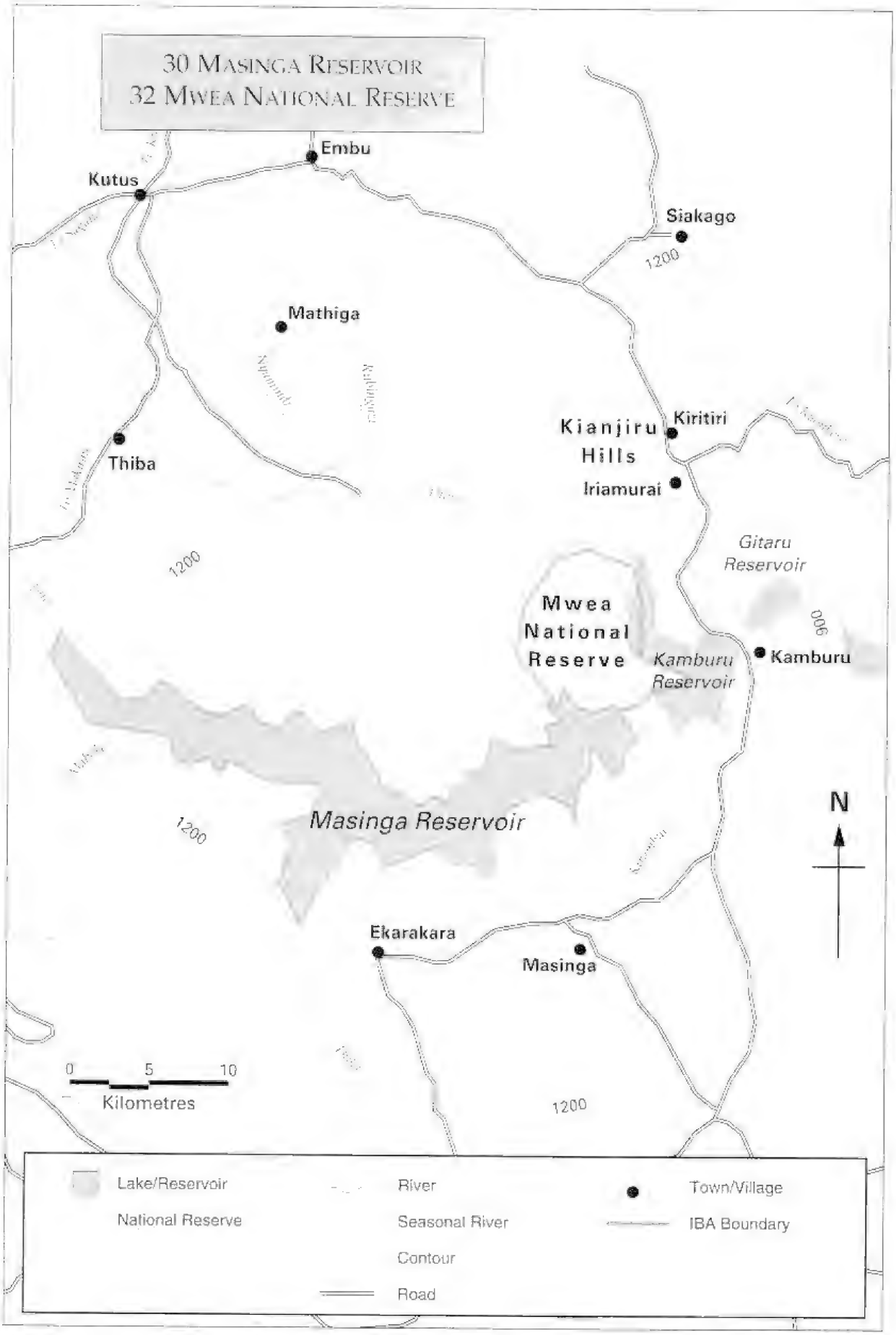
Large and small herbivores are numerous, including African Elephant *Loxodonta africana*. Nile Crocodile *Crocodylus niloticus* and Hippopotamus *Hippopotamus amphibius* occur in the dam. The plants are typical of *Acacia-Commiphora* woodland, including many *Combretum* species and trees of arid country such as *Boscia angustifolia* and *Balanites aegyptiaca*. Birnie (1992) and Campbell (1992) give further information on the flora.

Conservation issues

Conservation problems in Mwea centre on human–wildlife conflict. Animals, especially elephant and African Buffalo *Syncerus caffer*, move out of the Reserve to destroy crops in the settled areas nearby. The Kenya Wildlife Service is in the process of preparing a Management Plan for the Reserve, following on from a planning workshop held in June 1996. One of the steps then agreed was to construct an electric fence around the land boundary, both to prevent crop damage by animals and to prevent unauthorised access, destruction of trees and poaching by people. Work on the fence, and on a new Park Headquarters building and staff quarters, has now begun (J. Silvester, *in litt.*).

The elephant population, which numbered about 45 in 1995, is in any case felt to be too large for the size of the Reserve. Translocation of elephants began in late 1995, when a family group of five and a single bull were

Pel's Fishing Owl


30 Masinga Reservoir
32 Mwea National Reserve
Embu
Kutus
Siakago
1200
Mathiga
Thiba
Kianjiru Hills
Kiritiri
Iriamurai
Gitaru Reservoir
1200
Mwea National Reserve
Kamburu Reservoir
Kamburu
900
Masinga Reservoir
1200
N
Ekarakara
Masinga
0 5 10
Kilometres
1200
Lake/Reservoir
National Reserve
River
Seasonal River
Contour
Road
Town/Village
IBA Boundary

Globally-threatened species

*Hinde's Babbler	Endangered	Recently observed (C. Jackson, *in litt.*, Zimmerman *et al.* 1996)
Madagascar Squacco Heron	Near-threatened	An uncommon non-breeding visitor, May to October (Zimmerman *et al.* 1996)

**also restricted-range species*

Regionally-threatened species

African Darter	Vulnerable	Nests on Masinga Reservoir to the west
Martial Eagle	Vulnerable	Status unknown
Pel's Fishing Owl	Vulnerable	Recorded in dense riparian woodland

successfully immobilised and moved to Tsavo East National Park, and the programme is ongoing.

Questions of problem animals aside, Mwea's future as a Protected Area depends on attracting sufficient paying visitors to make it economically viable. This will require improving access roads, rehabilitating the internal roads, constructing offices, a gatehouse and staff housing, and developing campsites. There is also need to rehabilitate the nearby Masinga Tourist Lodge, owned by the Tana and Athi Rivers Development Authority. This provided a convenient base for visits to the Reserve but is presently closed. Given the importance of Mwea's birds, especially Hinde's Babbler, as an attraction, visitors should be given as much opportunity as possible to move about on foot, without being constantly confined to their vehicles.

Pollution of the Tana River by agricultural industries upstream is a problem, causing concern for the aquatic life in Kamburu Dam and limiting the possibilities of developing water-based recreation for visitors (Loefler 1989).

The density, distribution and habitat selection of Hinde's Babbler in the Reserve are presently unknown, and survey work is needed to feed into the management process.

Mwea is fortunate in that a conservation charity, the Mwea National Reserve Trust, has been working since 1990 to facilitate the Reserve's development. So far they have purchased a boat for the Warden and staff, to use for patrols and for waterfront tours by visitors; supplied local communities with fuel-efficient stoves, to reduce pressure on fuelwood in the Reserve; and carried out road construction to improve access. Further input from the Trust must await finalisation of the management planning process.

Further reading

Loefler 1989, Birnie 1992, Campbell 1992, Le Pelley 1992, Njau-ini 1996

33 Samburu and Buffalo Springs National Reserves

0°40'N, 37°30'E, Eastern Province, Isiolo District and Rift Valley Province, Samburu District

29,600 ha (Samburu 16,500 ha, Buffalo Springs 13,100 ha)

Altitude: 850–1,250 m

Status: National Reserves

Category: Somali-Masai biome species

Site description

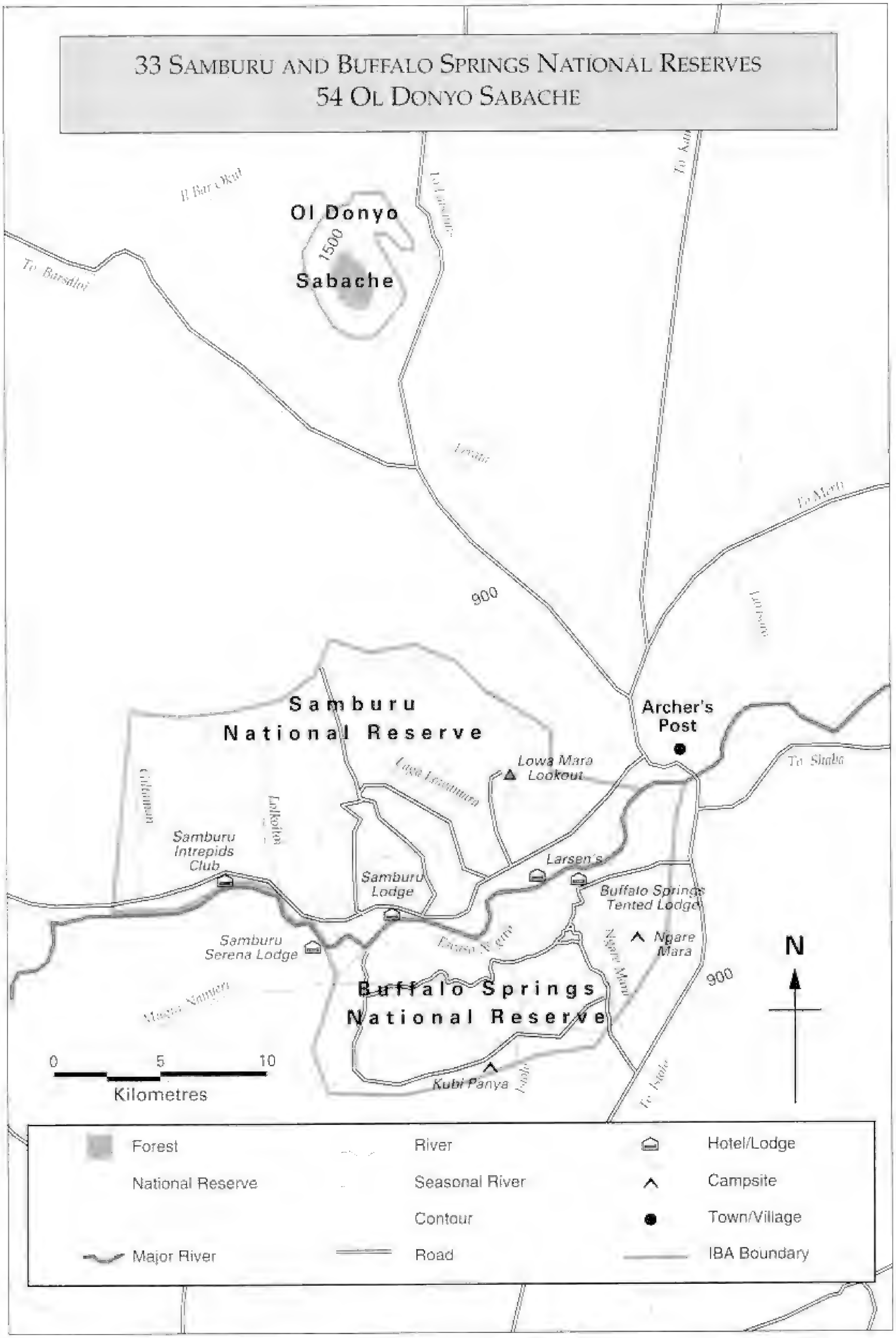
These small, adjoining savanna National Reserves lie either side of the Northern Ewaso Ng'iro River, some 340 km north north-east of Nairobi. They were established in 1948 as the Samburu-Isiolo Game Reserve, part of the once extensive Marsabit National Reserve. Now they are managed by their respective County Councils, Samburu and Isiolo. Buffalo Springs consists of gently rolling plains of volcanic origin, while Samburu is more rugged, with outcrops of ancient basement rocks forming isolated inselbergs. The soils are mainly sandy or gravelly; rainfall is around 350 mm per year.

Despite their relatively small size, the reserves contain contrasting habitats: rocky cliffs and scarps; pools, swamps and riverine sandbanks; arid open bush and grassland; tracts of *Acacia tortilis* woodland; and, along the banks of the Ewaso Ng'iro and its tributaries (the Isiolo and Ngare Mara), a narrow band of riverine forest with magnificent *Acacia elatior*, Tana River Poplar *Populus ilicifolia* and Doum Palm *Hyphaene compressa*. The Buffalo Springs themselves, with their pools and streams of clear, fresh water, are a magnet for thirsty wildlife in the dry season.

Birds

See Appendix 3 for key species. Some 61 of Kenya's 92 Somali-Masai biome species occur here, and birdlife is generally abundant and colourful; over 380 species are recorded (Finch *et al.* 1989). Birds of the arid northern bush country are augmented by a number of riverine forest species. Numerous raptors nest on the cliffs of Samburu's inselbergs. Several arid-country birds reach their southern limit here, including Donaldson-Smith's Sparrow Weaver, Shining Sunbird and Bristle-crowned Starling. Regionally threatened species are shown in the box. In addition,

White-headed Mousebird


33 Samburu and Buffalo Springs National Reserves
54 Ol Donyo Sabache
Ol Donyo Sabache
1500
To Barsaloi
900
To Meru
Samburu National Reserve
Archer's Post
To Shaba
Lowa Mara Lookout
Samburu Intrepids Club
Samburu Lodge
Larsen's
Buffalo Springs Tented Lodge
Ngare Mara
Samburu Serena Lodge
Buffalo Springs National Reserve
Kubi Panya
To Isiolo
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0
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Kilometres
Forest
National Reserve
Major River
River
Seasonal River
Contour
Road
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

two species of global conservation concern are recorded, Lesser Kestrel (vulnerable; a passage migrant, Finch *et al.* 1989) and Taita Falcon (vulnerable; status unclear, probably resident, Zimmerman *et al.* 1996).

Other wildlife

The park holds populations of several threatened mammal species, including Grevy's Zebra *Equus grevyi*, African Elephant *Loxodonta africana* and Cheetah *Acinonyx jubatus*. The increasingly uncommon Reticulated Giraffe *Giraffa camelopardalis reticulata* occurs in good numbers. The Tana River Poplar *Populus ilicifolia*, which grows along the Northern Ewaso Ng'iro river, is restricted to just three Kenyan river systems.

Conservation issues

The reserves are a popular tourist destination, the main attractions being their scenic beauty, remoteness and concentrations of photogenic wildlife. The surrounding areas are under increasing pressure from an expanding human population. Overstocking and unsustainable cutting of trees and shrubs, for fuelwood and building, are causing substantial environmental changes. The reserves themselves remain well protected, and there are few immediate threats to the birds that they contain. (See also Ol Donyo Sabache, IBA 53, and Shaba National Reserve, IBA 54.)

Further reading

Wilson 1989, Richards 1998

Regionally-threatened species

African Darter	Vulnerable	Sporadic visitor
Great Egret	Vulnerable	Sporadic visitor
White-headed Vulture	Vulnerable	Resident in small numbers
Martial Eagle	Vulnerable	Resident in small numbers
Yellow-billed Oxpecker	Vulnerable	Fairly common resident

From Finch et al. *(1989), Zimmerman* et al. *(1996)*

34 Shaba National Reserve

0°34'N, 37°57'E, Eastern Province, Isiolo District

23,900 ha

Altitude: 700–1,500 m

Status: National Reserve

Categories: Globally-threatened species, restricted-range species, Somali-Masai biome species

Site description

Shaba National Reserve consists of a low-lying, semi-arid plain on the southern bank of the Northern Ewaso Ng'iro River. It lies 9 km east of Buffalo Springs National Reserve (IBA 33), from which it is separated by the main road from Isiolo to Marsabit. Shaba was gazetted in 1974 and is administered by the Isiolo County Council. Its northern section includes a 34 km stretch of the Ewaso Ng'iro river; here and elsewhere in the Reserve are numerous springs and swampy areas, although some have bitter-tasting water. The starkly beautiful landscape is dominated by Shaba Hill to the south, at the foot of which is a rugged area with steep ravines. The sandy soils are volcanic in origin and rainfall is some 250–500 mm per year. Habitats in the Reserve include riverine woodland and thicket with patches of *Acacia elatior* and Doum Palm *Hyphaene compressa*, *Acacia tortilis* woodland, *Commiphora*-dominated bushland, open areas of lava rock with scattered grass and shrubs, alkaline grasslands (dotted with springs) and swamps.

Birds

See box and Appendix 3 for key species. This is the only protected area in which the enigmatic near-threatened, restricted-range Williams's Lark is known to occur. Out of the 92 Somali-Masai biome species in Kenya, an impressive 63 are known from Shaba. The avifauna is generally similar to that of the nearby Samburu-Buffalo Springs National Reserves (IBA 33). Small numbers of the globally threatened Lesser Kestrel (vulnerable) pass through Shaba on migration each year from the Palaearctic (Finch *et al.* 1989)

Other wildlife

Some 17 large mammal species are recorded, including the threatened Hunting Dog *Lycaon pictus*, Cheetah *Acinonyx jubatus*, Grevy's Zebra *Equus grevyi* and African Elephant *Loxodonta africana*. Reticulated Giraffe *Giraffa camelopardalis reticulata* also occurs.

Conservation issues

Apart from its diversity of Somali-Masai biome species, Shaba's chief importance as an IBA is the

Globally-threatened species

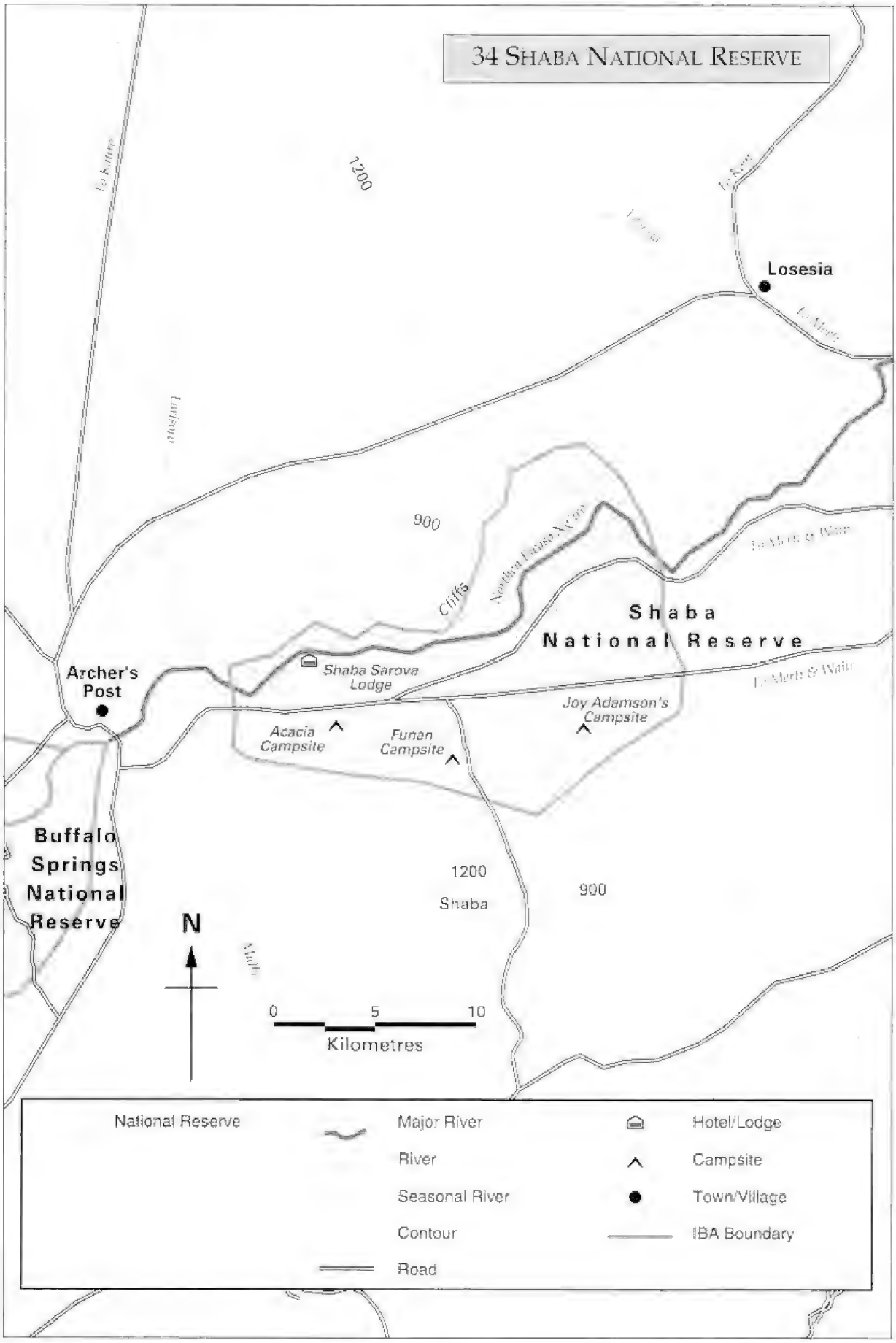
*Williams's Lark	Near-threatened	Local in rocky lava semi-desert with low *Barleria* shrubs (Turner 1998)

**also restricted-range species*

Regionally-threatened species

African Darter	Vulnerable	Sporadic visitor
Great Egret	Vulnerable	Sporadic visitor
White-headed Vulture	Vulnerable	Resident in small numbers
Martial Eagle	Vulnerable	Resident in small numbers)
Yellow-billed Oxpecker	Vulnerable	Fairly common resident

From Finch et al. *(1989) and Zimmerman* et al. *(1996).*


34 Shaba National Reserve
1200
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Losesia
Cliffs
Shaba
National Reserve
Archer's
Post
Shaba Sarova
Lodge
Joy Adamson's
Campsite
Acacia
Campsite
Funan
Campsite
Buffalo
Springs
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Kilometres
National Reserve
Major River
River
Seasonal River
Contour
Road
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

presence of Williams's Lark. Very little is known about this bird, and its habitat selection, numbers and movements need to be studied. However, Shaba and the lark's habitat are not in any immediate danger. The area north of the Reserve is used for military training, causing considerable environmental disruption. Intensification of grazing and firewood collection around the Reserve are also degrading habitat, and hunting for meat is rampant. These problems at times spill over into the Reserve itself, but their impact on the birds is unclear.

Shaba is a popular tourist destination because of its scenic beauty, and is world famous as the location of Joy Adamson's last adventure, the release of a young Leopard *Panthera pardus*. It is unclear what amount of visitor pressure the Reserve can sustain and, in the absence of a management plan, increasing tourist numbers may become a problem in the future.

Further reading

Wilson 1989, Richards 1998, Turner 1998

Williams's Lark

35 Dandora Ponds

01°16'S, 37°02'E, Nairobi Province, Nairobi District

Area: c. 300 ha

Altitude: 1,500 m

Status: Owned and managed by Nairobi City Council

Category: Congregations

Southern Pochard

Site description

The Dandora Oxygenation Ponds are situated 20 km due east of Nairobi city centre, just off the Nairobi-Kangundo road but within the city limits. The main sewage treatment works for Nairobi City, they consist of three experimental ponds, eight facultation ponds and 24 maturation ponds, all bounded by embankments. The first phase of eight ponds was commissioned in 1980, followed by the much larger second phase in 1992. The older set has mud banks, with associated growth of aquatic and emergent macrophytes such as species of *Cyperus* and *Typha;* the newer ponds have gently sloping concrete banks. Water quality and the microflora and fauna change as water progresses through the ponds. The treatment is entirely natural and considered environmentally friendly. Processed water from the ponds is discharged into the Nairobi River.

Birds

See box for key species. Dandora holds internationally important populations of Southern Pochard and (in the northern winter, from

Congregations

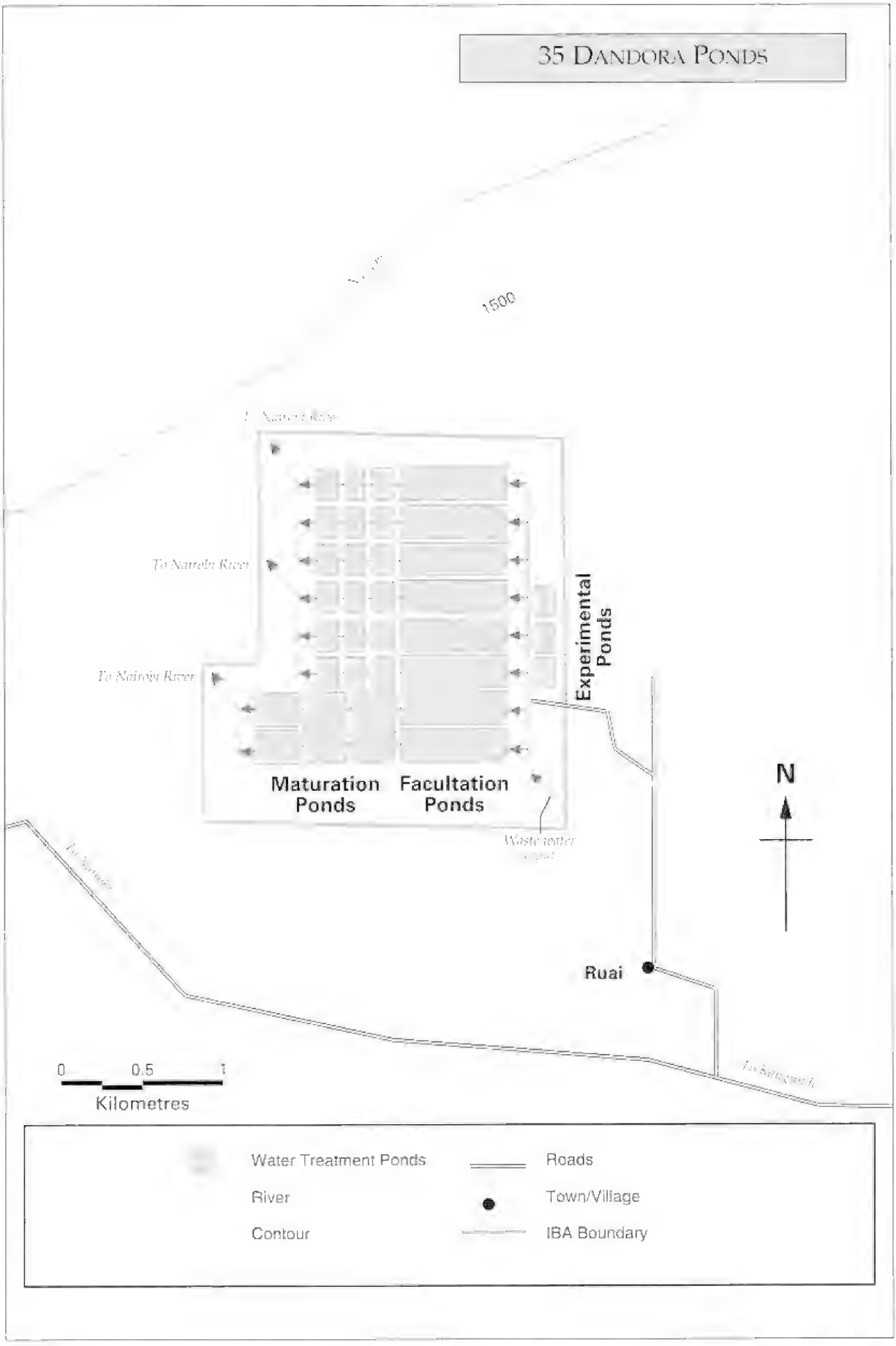
1% or more of biogeographic population

Southern Pochard (500)	1994–1997 mean: 1,480 (four counts); max: 3,200 (1994)
Northern Shoveler (1600)	2,300 (1996)

Data from the January counts of the African Waterfowl Census (Nasirwa & Bennun 1994, 1995, unpubl. data)

Regionally-threatened species

Great Egret	Vulnerable	Sporadic visitor, in small numbers


35 DANDORA PONDS
1500
To Nairobi River
To Nairobi River
Maturation Ponds
Facultation Ponds
Experimental Ponds
Waste water
N
Ruai
0
0.5
1
Kilometres
Water Treatment Ponds
River
Contour
Roads
Town/Village
IBA Boundary

November to February) Northern Shoveler. Duck are generally numerous, and there are often large flocks of White-faced and Fulvous Whistling Duck, Red-billed and Yellow-billed Duck, Hottentot Teal and (among the Palaearctic migrants) Northern Pintail and Garganey. January waterbird counts over the four years 1994–1997 have regularly recorded more than 50 species and up to 16,450 waterbirds (mean, 12,400), duck being the most abundant single group. Over 1,000 White-winged Terns are frequently present. Other conspicuous waterbirds include ibises, herons, geese and a variety of migrant waders. Migrant Yellow Wagtails and Red-throated Pipits are attracted to the pond edges, and seasonal flocks of bishops and queleas occur in the rank vegetation surrounding the complex.

Conservation issues

The ponds house not just birds but other aquatic animals such as Hippopotamus *Hippopotamus amphibius*, Nile Crocodile *Crocodylus niloticus*, and unknown species of fish. Mass die-offs of waterbirds have occurred at least twice at Dandora, apparently from bacterial toxins produced under unusual weather conditions (e.g. Waiyaki 1992), but these have been short-lived phenomena. The ponds have considerable potential for environmental education, especially for school children. However, although they are close to Nairobi and easily reached by public transport, access requires special permission and is generally discouraged. Management as a sewage treatment works, which is obviously the primary objective, is not necessarily incompatible with bird conservation or education, but the value of the site for wildlife is not yet fully recognised by the City Council.

Further reading

Waiyaki 1992, Waiyaki & Bennun 1993a, Nasirwa & Bennun 1994, 1995

36 Nairobi National Park

01°17'S, 36°49'E, Nairobi Province, Nairobi District

11,700 ha

Altitude: 1,540–1,780 m

Status: National Park

Categories: Globally-threatened species, restricted-range species, congregations

Site description

An area of natural landscape at the grassland-forest boundary, only 7 km from the centre of Kenya's capital city, Nairobi. The Park's varied habitats include open, rolling grass plains, riverine woodland, valley thicket and bush, man-made dams and ponds, rocky gorges and upland dry forest. The Park is fenced along three sides, where it is adjacent to urban housing, industry, roads and airports; only the southern border, along the Embakasi and Athi rivers, is open for animal dispersal. Ecologically, the Park is intimately linked to the Kitengela and Athi-Kapiti plains, which adjoin it to the south, forming a single ecological unit. Being close to the city centre and housing a variety of large mammals, this Park is a popular destination and a substantial money-earner for the Kenya Wildlife Service.

Congregations

More than 1% of population (at roost)

Lesser Kestrel (600)	Roosts of up to 5,000 have been recorded (Smalley 1983, Lewis & Pomeroy 1989, Zimmerman *et al.* 1996)

Birds

See boxes for key species. Nairobi National Park is an important roosting site for Lesser Kestrel flocks on passage, although numbers have declined markedly in recent years. The substantial area of undisturbed grassland is of great importance for species such as the restricted-range Jackson's Widowbird, which breeds here regularly after good rains. African Crowned Eagles nest in the forest. The avifauna is diverse, with a remarkable 516 species recorded (Harvey 1997), including 27 of Kenya's 92 Somali-Masai biome species (23 of which are regular), and 25 of Kenya's 67 African Highland biome species. The globally-threatened Corncrake is a scarce visitor from the Palaearctic, and the near-threatened Shoebill and Basra Reed Warbler have both been recorded once (Harvey 1997).

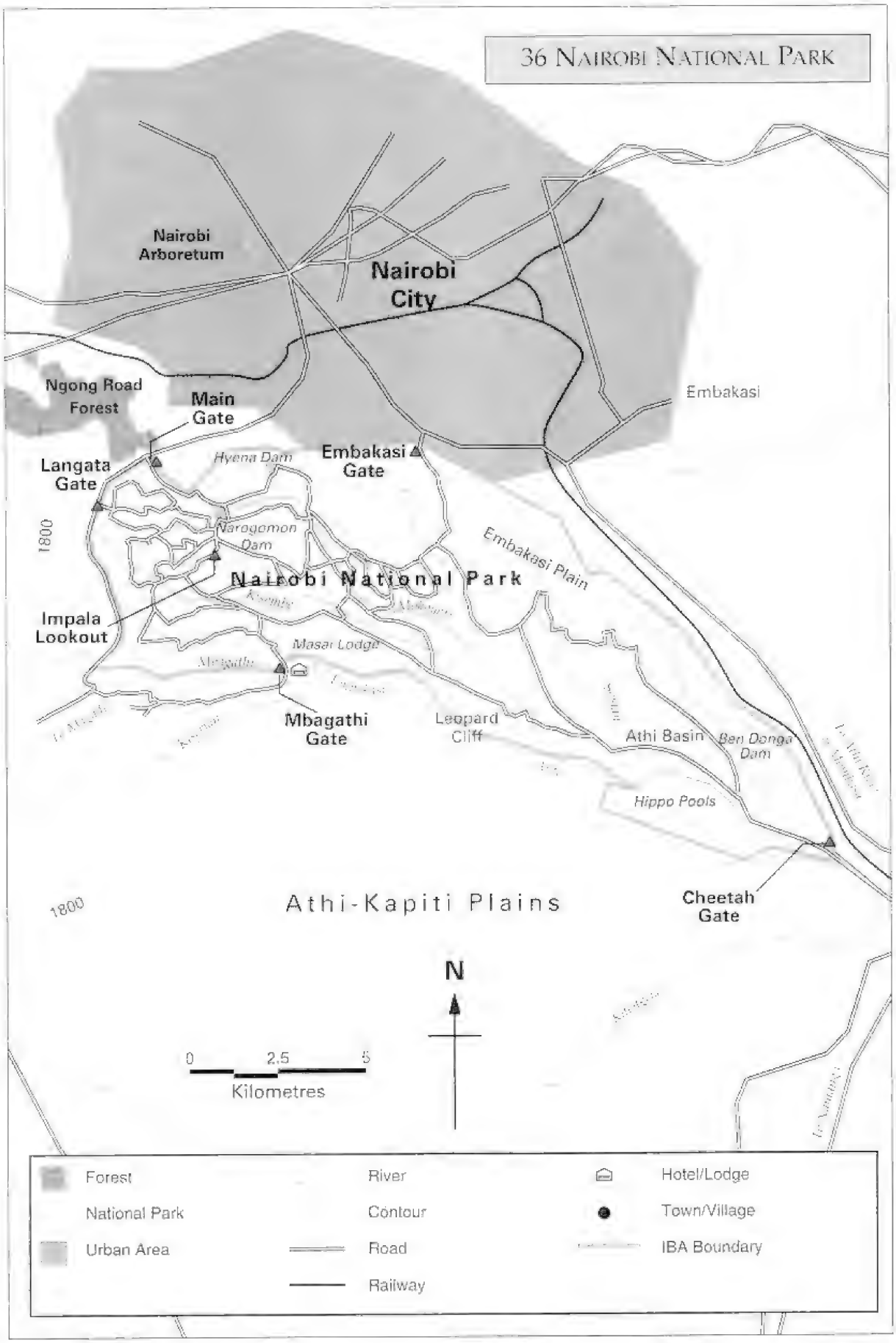
Other wildlife

Nairobi National Park has healthy populations of an array of large mammals. The Park is a rhino sanctuary and numbers of Black Rhinoceros *Diceros bicornis* are steadily increasing. Cheetah *Acinonyx jubatus* also occur in good numbers. Several plants growing on the rocky hillsides are unique to the Nairobi area, including *Euphorbia brevitorta*, *Drimia calcarata*, *Murdannia clarkeana* and the *Crassula* sp. A of Agnew & Agnew (1994) (F. Ng'weno, *in litt.*). The Park protects an important area of

Globally-threatened species

Madagascar Squacco Heron	Near-threatened	Regular non-breeding visitor in small numbers, May-October (Zimmerman *et al.* 1996, Harvey 1997)
Lesser Kestrel	Vulnerable	Regular on migration; see below
Red-throated Tit	Near-threatened	Fairly common in riverine *Acacia* woodland (Harvey 1997, unpubl. data)
*Jackson's Widowbird	Near-threatened	Nests regularly in tall grassland after good rains (Harvey 1997, unpubl. data)

**also restricted-range species*


36 Nairobi National Park
Nairobi Arboretum
Nairobi City
Ngong Road Forest
Main Gate
Embakasi
Langata Gate
Hyena Dam
Embakasi Gate
1800
Narogomon Dam
Embakasi Plain
Nairobi National Park
Impala Lookout
Masai Lodge
Mbagathi Gate
Leopard Cliff
Athi Basin
Ben Donga Dam
Hippo Pools
Cheetah Gate
Athi-Kapiti Plains
1800
N
0
2.5
5
Kilometres
Forest
National Park
Urban Area
River
Contour
Road
Railway
Hotel/Lodge
Town/Village
IBA Boundary

Regionally-threatened species

Common Ostrich	Vulnerable	Common on the open plains
African Darter	Vulnerable	Scarce visitor
Great Egret	Vulnerable	Regular visitor to dams and ponds
Saddle-billed Stork	Vulnerable	Resident in small numbers
Ayres's Hawk Eagle	Vulnerable	Scarce resident in the forest
African Crowned Eagle	Vulnerable	At least one pair nests in the forest
Martial Eagle	Vulnerable	Several pairs have home ranges that include the Park (C. Ong, unpubl. data)
African Finfoot	Vulnerable	Resident in small numbers on thickly-fringed sections of the rivers
Yellow-billed Oxpecker	Vulnerable	Moderately common

From Harvey (1997) and unpublished data

Croton-Brachylaena-Calodendrum upland dry forest (Beentje 1990). This distinctive Nairobi forest type exists now only as small, ever-diminishing fragments.

Conservation issues

The Park is a dry season sanctuary for plains game, particularly Wildebeest *Connochaetes taurinus*, Plains Zebra *Equus burchelli*, and Eland *Taurotragus oryx*. In the wet season, these animals disperse out of the Park onto the open plains of Kajiado District to the south. This migratory movement is becoming increasingly constrained by sprawling settlements and industrial development on the Kitengela and Athi-Kapiti plains. The Kitengela was originally set aside as a game conservation area, but in the 1970s land hunger around Nairobi became acute and people were allowed to settle there. As a result, ranches were fenced off, farms and vegetable plots sprang into being, and human-wildlife conflict became intense. Meanwhile, industrial development around Athi River township, in particular an export processing zone, has cut off migration from the other direction. Only a narrow corridor is now available for animals to move through, much of this depending on the so-called Sheep and Goat Land. This agricultural research area has now allegedly been allocated to influential individuals.

There are additional, though limited, options, such as purchase of land along the Mbagathi-Athi river frontage, and encouraging conservation-minded landowners to place easements on their land that restrict the uses to which it can be put (Western 1996). It is also important to ensure that wildlife within the dispersal areas has economic value to the landowners there, so that these areas remain suitable wildlife habitats. A new conservation group, the Friends of Nairobi National Park, is working with the Kenya Wildlife Service to explore these issues.

It is likely that the end result will be a 'truncated ecosystem', with some, but scaled-down, buffer areas remaining open for herbivore migrations (Western 1996). If this is not possible, and all the land around the Park is fenced and developed, the Park may effectively be strangled. Maintenance of the migration is important not just for the plains game and their predators, but for the ecosystem as a whole. Increased, year-round grazing pressure would greatly change the character of the grasslands and their bird communities. Species like Jackson's Widowbird, which have few areas of natural grassland left to nest in, could well be lost from the area as a result.

Being very close to (and increasingly, surrounded by) the city, Nairobi National Park faces some obvious additional problems. Waste from some industries drains directly into the Park and this has been difficult to control. Part of the Park will be hived off for a major bypass road in the near future, and increased pressure on land puts the entire site at potential risk. On the other hand, its proximity to the city makes Nairobi National Park an unparalleled facility for public education about wildlife and conservation.

Further reading

Smalley 1983, Loefler 1987, Mondolfi & Mondolfi 1993, Round-Turner 1996, Western 1996, Harvey 1997

Lesser Kestrel

37 Dunga Swamp

01°10'S, 34°47'E, Nyanza Province, Kisumu District

c. 500 ha

Altitude: 1,130 m

Status: Unprotected

Categories: Globally-threatened species, Lake Victoria Basin biome species

Site description

Dunga (or Tako River mouth) is a wetland situated about 10 km south of Kisumu town on the shores of Winam Gulf, Lake Victoria. At the western limit is a beach, used as a major fish landing point. Papyrus *Cyperus papyrus* stands stretch south-eastwards along the shore from here for about 5 km, in a strip that varies in width from about 50 to 800 m. A number of streams drain into the lake through the swamp, the main one being Tako River.

Birds

See box and Appendix 3 for key species. This site is one of the most reliable sites in Kenya for the scarce and threatened Papyrus Yellow Warbler. All but one of Kenya's nine Lake Victoria Basin biome species have been recorded here, and it is especially important for Papyrus Gonolek, White-winged Warbler and Papyrus Canary, all papyrus endemics.

Papyrus Yellow Warbler

Other wildlife

No information is available. Wetlands around the shores of Lake Victoria are known to be important refuges for a number of the lake's endemic haplochromine fish species.

Conservation issues

Dunga is close to a major town, and this puts particular strain on the wetland. Papyrus harvesting is often excessive and unsustainable. The incoming streams bring pollution in the form of sewage and solid wastes from nearby residential estates.

Lake Victoria's papyrus swamps are under increasing pressure in general. The Water Hyacinth *Eichhornia crassipes* has infested much of the Winam Gulf (e.g. Johnstone & Githongo 1997). By preventing fishermen from fishing, it forces them to seek other forms of livelihood. Often, the only alternative available is to harvest papyrus, or to clear it in order to cultivate crops.

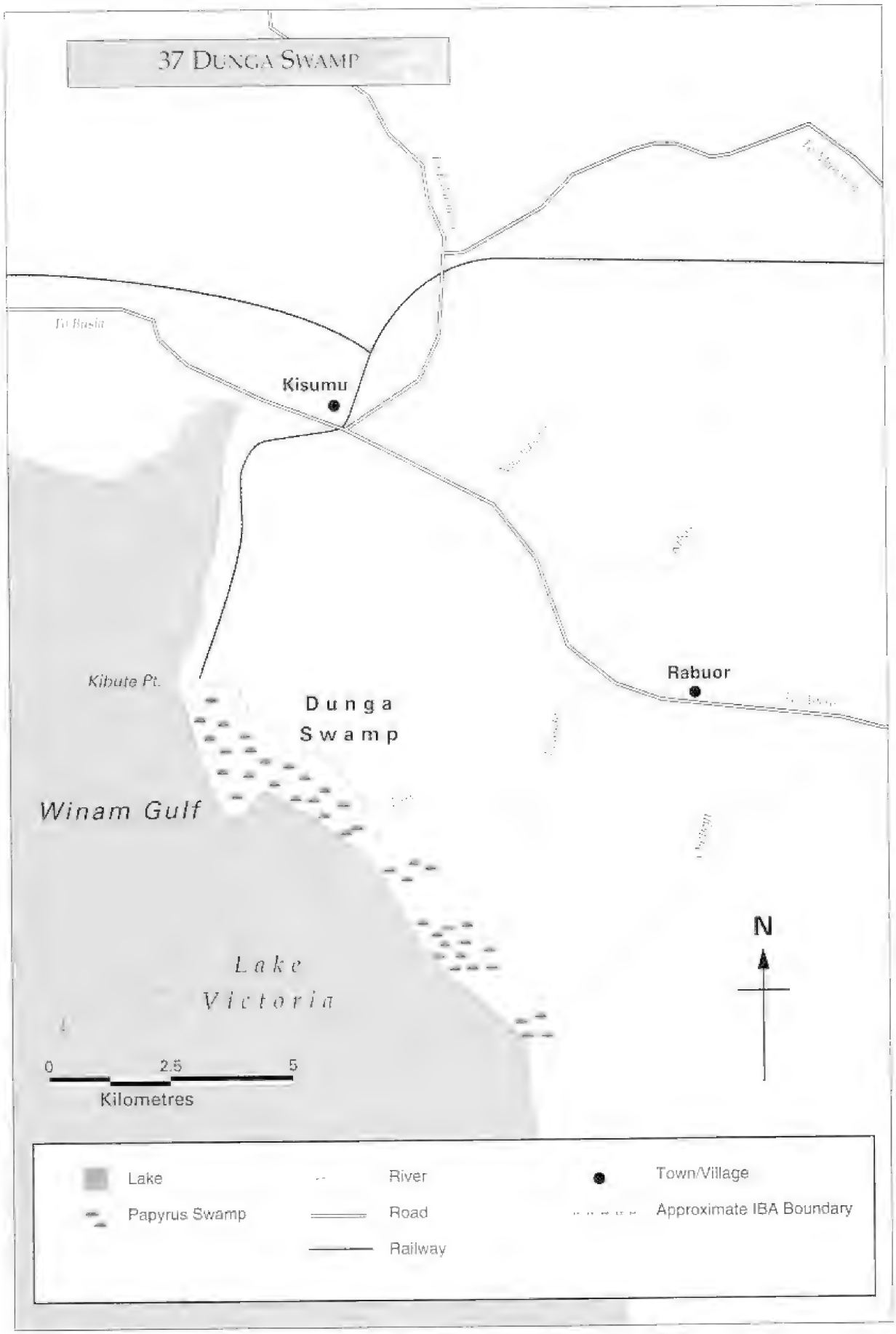
Dunga urgently requires better formal protection, as it has no conservation status at present. The site is already a popular area for recreation. Its proximity to Kisumu town gives it potential for environmental education and bird tourism focused on the papyrus endemics.

Further reading

Nasirwa & Njoroge 1997

Globally-threatened species

Papyrus Gonolek	Near-threatened	Relatively common (Nasirwa & Njoroge 1997)
Papyrus Yellow Warbler	Vulnerable	Often seen along the lakeward side of the swamp (B. Finch, *in litt.*)


37 DUNGA SWAMP
To Busia
Kisumu
Kibute Pt.
Dunga
Swamp
Rabuor
Winam Gulf
Lake
Victoria
N
0
2.5
5
Kilometres
Lake
Papyrus Swamp
River
Road
Railway
Town/Village
Approximate IBA Boundary

38 KOGUTA SWAMP

0°17'S, 34°36'E, Nyanza Province, Kisumu District

c. 1,800 ha

Altitude: 1,130 m

Status: Unprotected, public land

Categories: Globally-threatened species, Lake Victoria Basin biome species

Site description

Koguta Swamp is a wetland at the mouth of the Sondu-Miriu river, a few kilometres south-west of the Nyando river mouth on the shores of Lake Victoria. The vegetation consists mainly of reeds *Phragmites* spp. interspersed with patches of papyrus *Cyperus papyrus* and *Vossia cuspidata*. Koguta is flooded during the wet season, while during the dry season the area is heavily grazed and trampled by cattle and Hippopotamus *Hippopotamus amphibius*.

Birds

See box and Appendix 3 for key species. The globally-threatened Papyrus Yellow Warbler has been recorded here, one of six Lake Victoria Basin biome species that are known to occur, including the papyrus endemics Papyrus Gonolek, White-winged Warbler and Carruthers's Cisticola.

Other wildlife

Little information is available. Sitatunga *Tragelaphus spekei* and African Python *Python sebae* occur, but their status is unknown. Like other wetlands around the shores of Lake Victoria, Koguta is probably an important refuge for a number of the lake's endemic haplochromine fish species.

Conservation issues

The site is almost inaccessible from the lakeward side due to dense mats of Water Hyacinth *Eichhornia crassipes*. As in many part of Lake Victoria, infestation by this exotic weed has prevented fishermen from fishing, forcing them to seek alternative forms of livelihood. This adds greatly to the human pressure on papyrus swamps and other wetlands (e.g. Johnstone & Githongo 1997). Koguta is threatened by unsustainable cutting of papyrus, and overgrazing by cattle during the dry season when the water level recedes. It requires formal protection, and a community conservation programme that will work towards controlled, sustainable use of the wetland.

Further reading

Nasirwa & Njoroge 1997

White-winged Warbler

Globally-threatened species

Papyrus Yellow Warbler	Vulnerable	Present but uncommon (Nasirwa & Njoroge 1997)
Papyrus Gonolek	Near-threatened	Relatively abundant (Nasirwa & Njoroge 1997)


38 KOGUTA SWAMP
Lake Victoria
Koguta Swamp
Sango Pt.
Osodo Pt.
Nyakach Bay
Osodo Bay
Koguta
Nyakwere
Sangoro
To Kisumu
To Kendu Bay
Rakwaro
Sondu-Miriu
N
Kajiei
To Kendu Bay
0
2.5
5
Kilometres
Awach Kibuon
Lake
Seasonal Marsh
Papyrus Swamp
River
Contour
Road
Town/Village
IBA Boundary

39 KUSA SWAMP

01°19'S, 34°51'E, Nyanza Province, Kisumu District

c. 1000 ha

Altitude: 1,130 m

Status: Unprotected, public land

Categories: Globally-threatened species, Lake Victoria Basin biome species

Site description

Kusa Swamp, the mouth of River Nyando, is a wetland at the easternmost end of Lake Victoria's Winam Gulf. Dense stands of papyrus *Cyperus papyrus* are fringed on the lakeward side by the water grass *Vossia cuspidata* and along the shore by reeds *Phragmites* spp.

Birds

See box and Appendix 3 for key species. Kusa includes a substantial stand of papyrus, and the near-threatened Papyrus Gonolek is fairly abundant here. Other Lake Victoria Basin biome species include the papyrus endemics White-winged Warbler and Carruthers's Cisticola, and it is suspected that Papyrus Canary and the globally threatened Papyrus Yellow Warbler are likely to occur.

Other wildlife

Little information is available. The Sitatunga *Tragelaphus spekei* occurs but is uncommon, and African Python *Python sebae* is recorded. Like other wetlands around the shores of Lake Victoria, Kusa is probably an important refuge for a number of the lake's endemic haplochromine fish species.

Conservation issues

Kusa remains a sizeable enough papyrus swamp to be of conservation importance. However, uncontrolled cutting of papyrus by the local residents and pollution and siltation from the Nyando River are serious threats. Though papyrus shows remarkable powers of regeneration, unsustainable cutting for the local mat-making industry has the potential to destroy the wetland. Local residents are also opening up the swamp for rice farming. Sitatunga, though already rare, are hunted. The lakeward side is almost choked by the Water Hyacinth *Eichhornia crassipes*. As in many parts of Lake Victoria, infestation by this exotic weed has prevented fishermen from fishing, forcing them to seek alternative forms of livelihood and adding greatly to the human pressure on wetlands (e.g. Johnstone & Githongo 1997).

Further reading

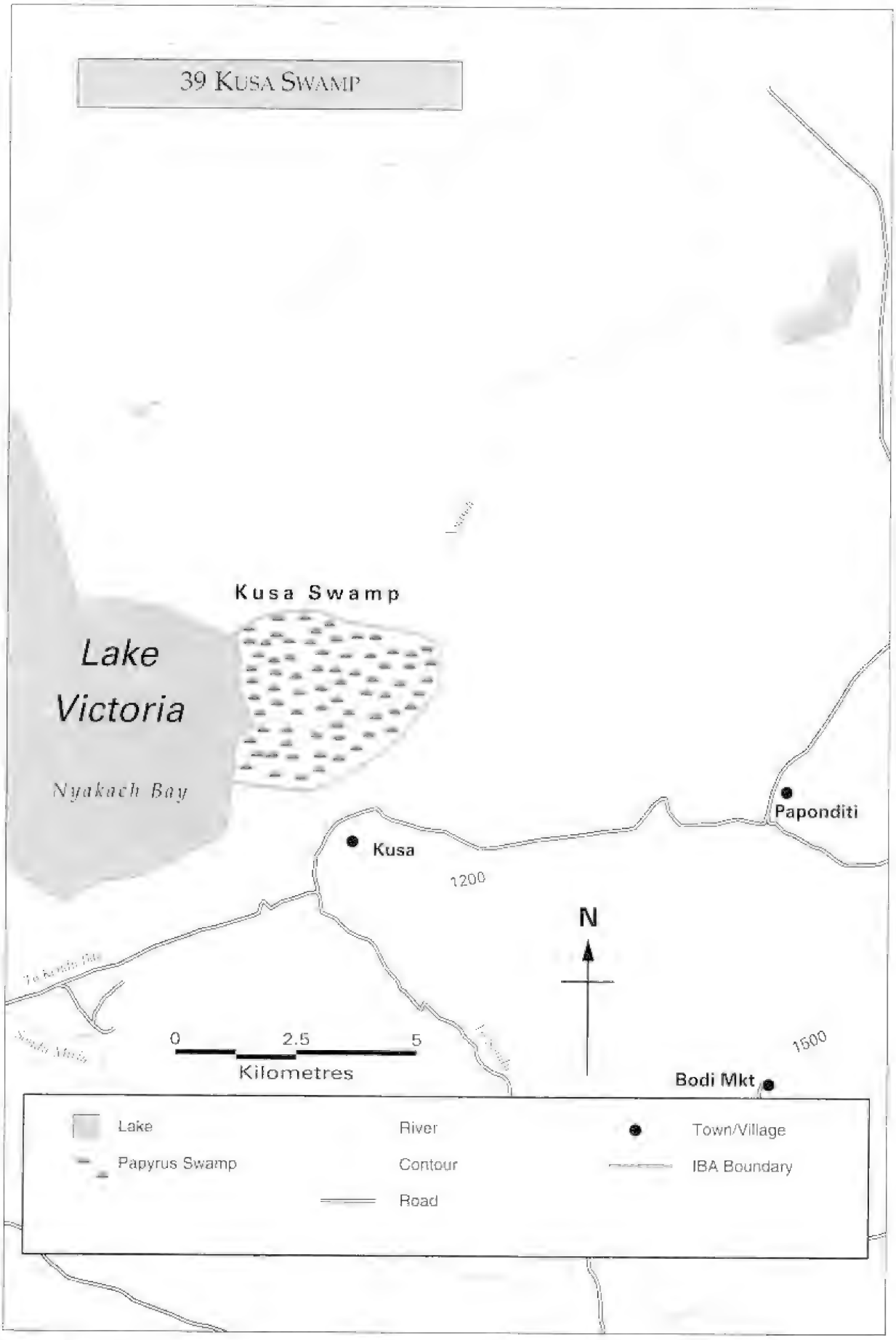
Nasirwa & Njoroge 1997

Papyrus Gonolek

Globally-threatened species

Papyrus Gonolek	Near-threatened	Relatively common (Nasirwa & Njoroge 1997)

39 KUSA SWAMP



40 Ruma National Park

0°35'S, 34°12'E, Nyanza Province, Suba District

12,000 ha

Altitude: 1,200–1,600 m

Status: National Park

Category: Globally-threatened species

Site description

Ruma National Park was first gazetted in 1966, as Lambwe Valley Game Reserve, and acquired National Park status in 1983. It is situated 10 km east of Lake Victoria in western Kenya, south-west of Homa Bay and east of the Gembe and Gwasi Hills. It lies on the flat floor of the Lambwe valley, bordered by the Kanyamaa escarpment (and including a section of Lambwe Hills Forest Reserve) to the south-east. The terrain is mainly rolling grassland, with tracts of open woodland and thickets dominated by species of *Acacia* and *Balanites*. The soils are largely 'black cotton' clay. The surrounding area is settled, with a mix of small-scale cultivation and grassy pasture-land.

Birds

Ruma is the only protected area in Kenya where the Blue Swallow, a scarce intra-African migrant, is regularly recorded. Blue Swallows arrive in Kenya from their breeding grounds in southern Tanzania around April and depart in September. They depend on moist grassland for feeding and roosting. (See also IBA 57, Busia Grasslands.) Black-backed Cisticola, a species thought to be extinct in Kenya, has also been reported from Ruma, but these records are unconfirmed (D.A. Turner, *in litt.*).

Other wildlife

A variety of mammals occur in the park but the most notable is the Roan Antelope *Hippotragus equinus*, a rare species in Kenya. Others include Oribi *Ourebia ourebi*. Little is known about other fauna and flora.

Conservation issues

Ruma represents a valuable island of natural habitat in a sea of human settlement. The surrounding population density is high, but people and their livestock avoid the Ruma area because of the presence of tsetse fly. Wildlife poaching along the boundaries has been reported in the past.

A recent, brief survey found no Blue Swallows at the site (Nasirwa & Njoroge 1997). More intensive work is needed to determine the status of this threatened species, and a proper ecological study should be made of the birds and their behaviour.

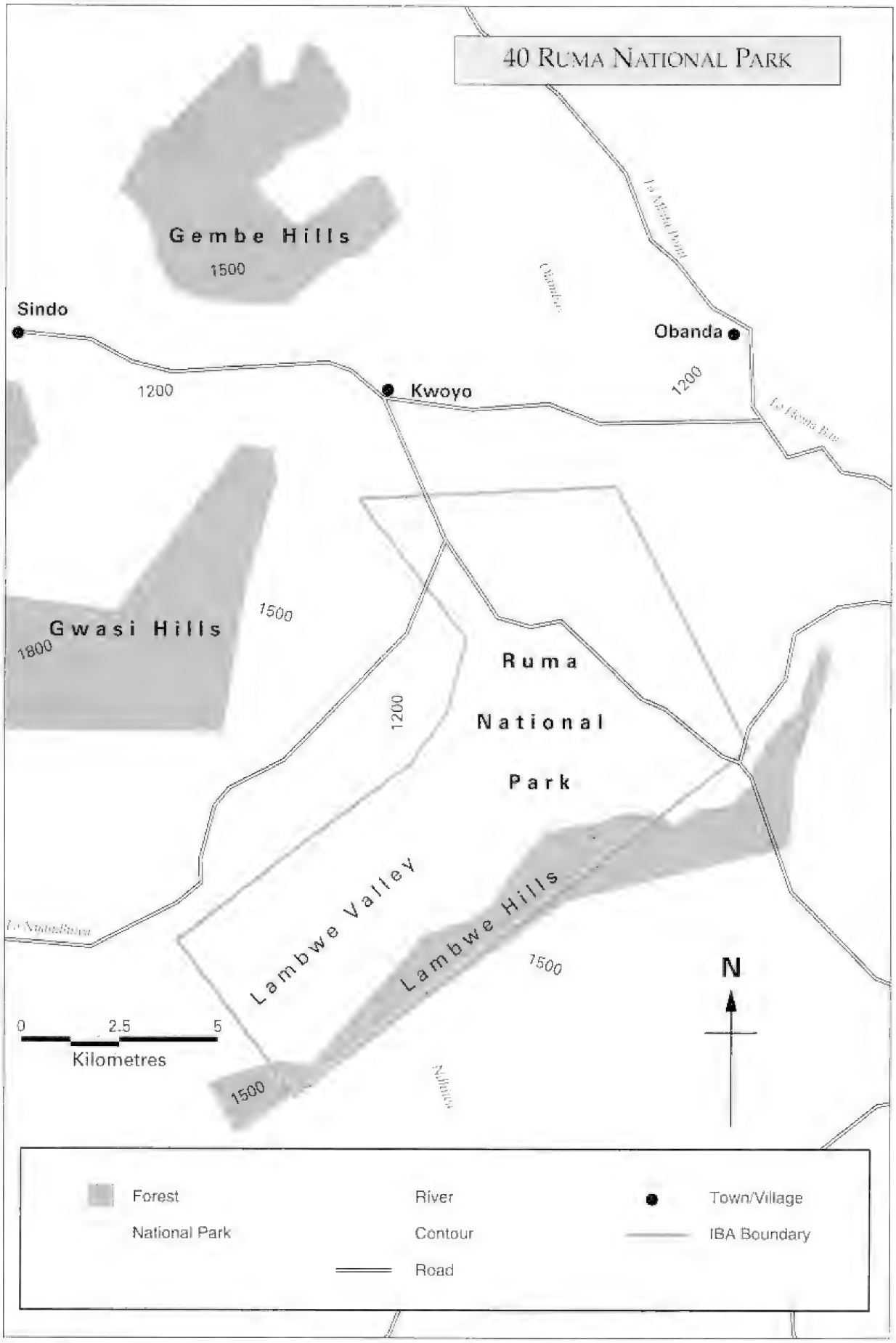
Further reading

Nasirwa & Njoroge 1997

Blue Swallow

Globally-threatened species

Blue Swallow	Vulnerable	Several recent records, April–September (Zimmerman *et al.* 1996), but not seen during a 1996 survey (Nasirwa & Njoroge 1997)


40 RUMA NATIONAL PARK
Gembe Hills
1500
Sindo
Obanda
Kwoyo
1200
1200
Gwasi Hills
1800
1500
Ruma
National
Park
1200
Lambwe Valley
Lambwe Hills
1500
1500
N
0
2.5
5
Kilometres
Forest
National Park
River
Contour
Road
Town/Village
IBA Boundary

41 Yala Swamp Complex

0°05'N, 34°11'E, Nyanza Province, Siaya District and Western Province, Busia District

c. 8,000 ha

Altitude: 1,130–1,160 m

Status: Unprotected

Categories: Globally-threatened species, Lake Victoria Basin biome species

Site description

This is a complex of wetlands in the delta of the Yala River, on the north-east shore of Lake Victoria. The site has three main components: the Yala Swamp itself (currently c. 6,500 ha after drainage of the eastern fifth); Lake Kanyaboli in the north-eastern corner, a 3 m deep lake of around 1,000 ha; and Lake Sare, the most southerly of several outlets of the Yala River into Lake Victoria, around 5 m deep and 500 ha in area. Formerly, the Yala River flowed through the eastern swamp (now 'reclaimed') into Lake Kanyaboli, then into the main swamp, and finally into Lake Victoria via a small gulf. The Yala flow is now diverted directly into the main swamp, and a silt-clay dike cuts off Lake Kanyaboli, which receives its water from the surrounding catchment and through back-seepage from the swamp. A culvert across the mouth of the Yala, some metres above the level of Lake Victoria, has cut off the gulf on the lake and, through back-flooding, created Lake Sare (Mavuti 1992).

Water in the main channels and lakes is well oxygenated, but oxygen levels in the stagnant parts of the swamp are low (below 4 mg O_2/litre) (Mavuti 1992). Conductivities are in the range of 100–130 µS/cm in the channels and Lake Sare, but considerably higher in Lake Kanyaboli due to the lack of fresh water inflow from the river (a feeder canal has fallen into disrepair).

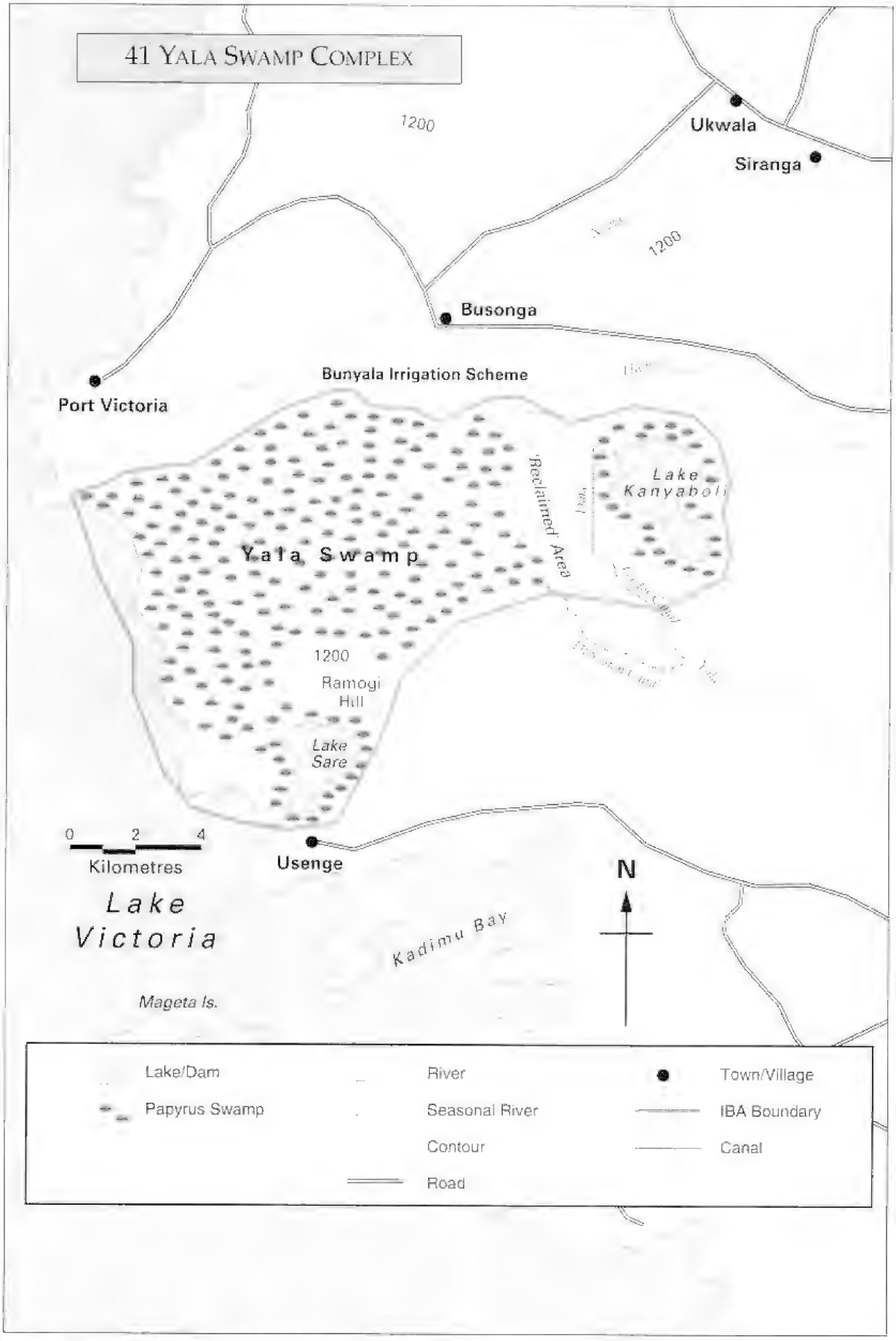
The predominant vegetation is papyrus *Cyperus papyrus*, with *Phragmites mauritianus* in shallower areas and swamp grasses around the periphery. Both Lake Kanyaboli and Lake Sare are surrounded by a thick fringe of papyrus; in the case of Lake Sare, this merges with the main swamp.

The Yala Swamp complex is by far the largest papyrus swamp in the Kenyan sector of Lake Victoria, making up more than 90% of the total area of papyrus (Nasirwa & Njoroge 1997). The swamp acts as a natural filter for a variety of biocides and other agricultural pollutants from the surrounding catchment, and also effectively removes silt before the water enters Lake Victoria. The site supports an important local fishery for the Luo and Luhya people who live to its south and north, respectively.

Birds

See box and Appendix 3 for key species. Yala Swamp holds eight out of Kenya's nine Lake Victoria biome species, including the globally-threatened Papyrus Yellow Warbler. The near-threatened Great Snipe, a Palaearctic migrant, probably also occurs. Because of its size and the generally good condition of the papyrus, the Yala Swamp complex is an important site for East Africa's papyrus endemics. These include Papyrus Yellow Warbler, Carruthers's Cisticola, White-winged Warbler and Papyrus Canary. Many other wetland birds also occur (Britton 1978, Nasirwa & Njoroge 1997). Reports of occasional sightings of Shoebill by the local residents have not been confirmed.

Papyrus Canary


41 YALA SWAMP COMPLEX
1200
Ukwala
Siranga
1200
Busonga
Bunyala Irrigation Scheme
Port Victoria
Lake Kanyaboli
Reclaimed Area
Yala Swamp
1200
Ramogi Hill
Lake Sare
0 2 4
Kilometres
Usenge
N
Lake Victoria
Kadimu Bay
Mageta Is.
Lake/Dam
Papyrus Swamp
River
Seasonal River
Contour
Road
Town/Village
IBA Boundary
Canal

Globally-threatened species		
Papyrus Gonolek	Near-threatened	Reasonably common (Britton 1978, Nasirwa & Njoroge 1997)
Papyrus Yellow Warbler	Vulnerable	Resident in small numbers (Britton 1978, Nasirwa & Njoroge 1997)
Regionally-threatened species		
Great Egret	Vulnerable	Present in small numbers (O. Nasirwa, unpubl. data)
Baillon's Crake	Vulnerable	Recorded from Lake Kanyaboli, but may not be resident (Zimmerman *et al.* 1996)

Other wildlife

Lake Kanyaboli is an important refuge for Lake Victoria cichlids, many of which have been exterminated in the main lake by the introduction of Nile Perch *Lates niloticus* (Mavuti 1992). These include economically important species such as *Oreochromis esculentus*, as well as a number of *Haplochromis* species. Kanyaboli has a rich fish community, and is an important nursery and refuge for *Protopterus aethiopicus* and *Clarias mossambicus*. The Nile Perch is present in Lake Sare, which has an impoverished fish fauna compared to Kanyaboli. Other common fish species in the lakes and swamp are *Labeo victorianus*, *Synodontis victoriae*, *S. afrofischeri*, *Mormyrus* spp. and *Barbus* spp.

Conservation issues

Drainage of the Yala Swamp began as early as 1956, and there are still plans to extend the 'reclaimed' area over much of the present swamp. This is an intensely controversial issue, pitting the obvious needs of a swelling population for agricultural land against the less conspicuous values of wetlands — for instance, water filtration, flood control, and protection of fish stocks. In the case of Yala, biodiversity conservation must be added high on the list of values. This is a very important site for protecting the increasingly threatened suite of papyrus birds, as well as one of the last remnants of Lake Victoria's extraordinary cichlid radiation.

The area around the swamps is densely populated, and most people make a living from agriculture and fishing. Apart from drainage, major threats include water offtake for irrigation up-river, intensification of fertiliser and biocide inputs, and unsustainable exploitation of papyrus. Large-scale cutting, mainly for the mat-making industry, and extensive burning to open up land for cultivation are taking their toll on the swamp, despite the remarkable regenerative abilities of papyrus. Rehabilitation of the feeder canal to Lake Kanyaboli should be a high priority, as the lack of regular inflows from the river are changing its water chemistry and may interfere with its functions as a fish refuge and nursery. Finally, a study of the papyrus-endemic birds, to determine their population sizes, movements, and habitat requirements, is an important pre-requisite to management planning. The biodiversity value of Yala Swamp should be recognised by affording the site some formal protection, such as listing as a wetland of international importance under the Ramsar Convention. Yala would comfortably qualify for this, as it is both an outstanding example of a specific type of wetland and supports an appreciable assemblage of threatened and endemic species.

Further reading

Britton 1978, Mavuti 1992, Nasirwa & Njoroge 1997

42 Amboseli National Park

2°33'S, 37°06'E, Rift Valley Province, Kajiado District

39,200 ha

Altitude: 1,100–1,200 m

Status: National Park,

Category: Somali-Masai biome species

Site description

Amboseli National Park lies immediately north-west of Mt Kilimanjaro, on the border with Tanzania. Amboseli was established as a nature reserve in 1968, and gazetted as a National Park in 1974. It is surrounded by six communally-owned Group Ranches, the wet-season dispersal areas for wildlife, whose management has direct influence on the ecological stability of the park.

The Park covers part of a Pleistocene lake basin, now dry. Within this basin is a temporary lake, 'Lake' Amboseli, that floods during years of heavy rainfall. The Amboseli area is in the rain-shadow of Mt Kilimanjaro and receives only around 300 mm of rain per year on average. However, water flowing underground from Mt Kilimanjaro upwells here in a series of lush papyrus *Cyperus papyrus* swamps that provide dry-season water and forage for wildlife. These are flanked by tracts of attractive *Acacia xanthophloea* woodland. Open *Acacia tortilis* woodland also occurs on drainage lines in the southern part of the Park. The basin is surrounded by *Acacia–Commiphora* bushland, while the level floor, with alkaline soils, supports thickets of *Salvadora persica* and *Suaeda monoica*. Large concentrations of wildlife occur here in the dry season. This, with the picturesque surroundings (dominated by the imposing bulk of Mt Kilimanjaro), have made Amboseli a major tourist destination, attracting over 200,000 visitors each year.

Birds

See Appendix 3 for key species. The park has a rich bird fauna, with 42 of the 92 Somali-Maasai biome species that occur in Kenya. Many wetland birds use, and at times nest in, the swamps. Over 400 bird species have been recorded, among them over 40 birds of prey. Several species of global conservation concern occur, including Lesser Kestrel (vulnerable; on passage), small numbers of non-breeding Madagascar Squacco Herons (near-threatened; mainly from May to October) and Lesser Flamingo (near-threatened; present in variable numbers, up to a few thousand: Waiyaki & Bennun 1993b). The near-threatened Shoebill has been recorded once (Kent 1994, Davidson *et al.* 1994). Amboseli's regionally-threatened species are shown in the box.

Other wildlife

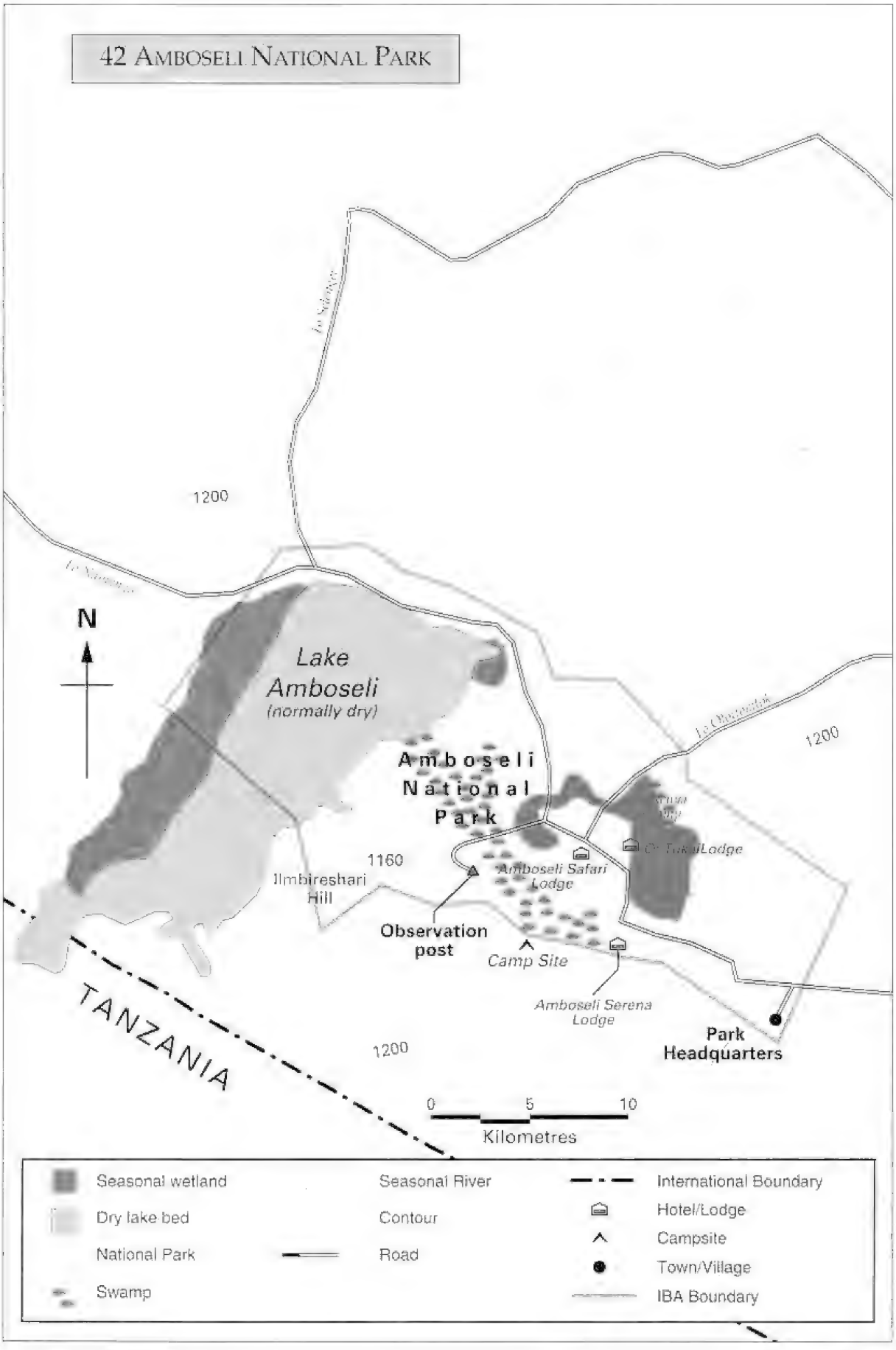
Amboseli is well known for its populations of large mammals. The Park's African Elephant *Loxodonta africana*, which number around 1,000, are the subject of a long-term behavioural and ecological study. The Park's population of Black Rhinoceros *Diceros bicornis* has been exterminated.

Conservation issues

When Amboseli was first established as a nature reserve in 1968, the boundaries were largely arbitrary and failed to cover the wet-season wildlife dispersal areas (Western 1982). The later upgrading to National Park status was in part an attempt to arrest the ongoing conflict between wildlife and the pastoral Maasai and their livestock. Unfortunately, this problem continues to bedevil Amboseli.

Amboseli remains an ecosystem in flux. The Park depends heavily on subterranean water from Mt Kilimanjaro: any change of climate or land-use

Black-faced Sandgrouse


42 AMBOSELI NATIONAL PARK
1200
N
Lake
Amboseli
(normally dry)
Amboseli
National
Park
1160
Ilmbireshari
Hill
Amboseli Safari
Lodge
Observation
post
Camp Site
Amboseli Serena
Lodge
Park
Headquarters
1200
1200
TANZANIA
0
5
10
Kilometres
Seasonal wetland
Dry lake bed
National Park
Swamp
Seasonal River
Contour
Road
International Boundary
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

Regionally-threatened species

African Darter	Vulnerable	A scarce non-breeding visitor
Great Egret	Vulnerable	Usually present in small numbers in the swamps
White-backed Duck	Vulnerable	Occasional visitor
White-headed Vulture	Vulnerable	Uncommon resident
Martial Eagle	Vulnerable	Resident in small numbers

From unpublished data and Zimmerman et al. *(1996)*

on the mountain affects the water table, the swamps and the general distribution of vegetation (Okwaro 1996). In fact, the swamp area has expanded greatly in recent years, leading to a general increase in numbers of waterbirds. On the other hand, the *Acacia xanthophloea* woodlands and other woody vegetation have declined markedly over the last 20 years. Due in part to soil salinisation following a natural shift in the water table (Western 1982), this decline has been hastened by heavy browsing pressure from elephants. Through fear of the Maasai in the group ranches outside the park, the Amboseli elephants have confined themselves to the park boundaries, not moving out to feed as they used to at certain times of the year (Smith 1996). This is one example of the park's major problem: human–wildlife conflict. During the dry season, the Maasai need to graze their cattle around the swamps; during the wet season, the wildlife moves out of the park onto their land in search of pasture. This problem appears to have been at least partially resolved in recent years: artificial water points around the park now provide a reliable water supply for Maasai livestock; group ranches are compensated for the presence of wildlife on their land; and the group ranches, recognising the economic value of wildlife, have begun to set up wildlife sanctuaries of their own.

The large number of tourists visiting Amboseli, mainly in the dry season, also exert considerable pressure on the ecosystem. Off-road driving kills vegetation and encourages wind erosion of the fragile soils (Okwaro 1996), and also contributes to harassment of sensitive species such as Cheetah *Acinonyx jubatus*. Recent road rehabilitation has helped to reduce this and to spread visitor pressure to less-frequented parts of the park. Accommodation for visitors is concentrated in the Ol Tukai area, which is under the jurisdiction of the Kajiado County Council rather than Kenya Wildlife Service, and uncontrolled development here has created local environmental problems.

Further reading

Shorter 1982, Western 1982, Waiyaki & Bennun 1993b, Okwaro 1996, Smith 1996

43 Cherangani Hills

01°16'S, 35°51'E, Rift Valley Province, Elgeyo Marakwet,
West Pokot and Trans-Nzoia Districts

c. 95,600 ha

Altitude: 2,000–3,365 m

Status: Forest Reserve

Category: Afrotropical Highlands biome species

Site description

The Cherangani Hills, an old fault-block formation of non-volcanic origin, form an undulating upland plateau on the western edge of the Rift Valley. To the east, the Elgeyo Escarpment drops abruptly to the floor of the Kerio Valley, while westwards the land falls away gently to the plains of Trans-Nzoia District. The hills reach 3,365 m at Cheptoket Peak in the north-central section.

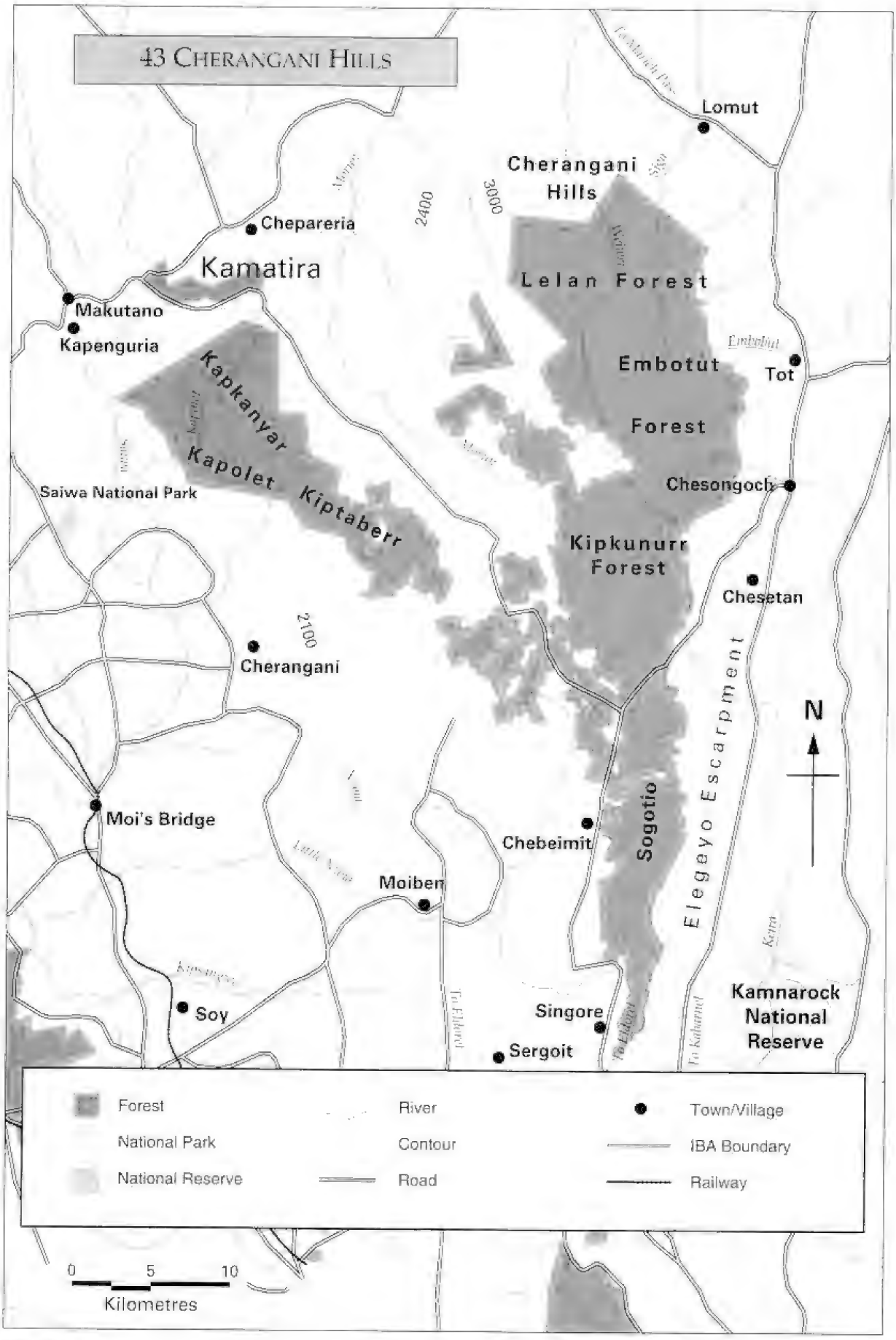
The hills are largely covered by a series of Forest Reserves. These are made up of thirteen administrative blocks, totalling 95,600 ha in gazetted area. Of this, around 60,500 ha is closed-canopy forest, the remainder being formations of bamboo, scrub, rock, grassland, moorland or heath, with about 4,000 ha of cultivation and plantations (Blackett 1994i,j). Kapkanyar, Kapolet and Kiptaberr Forest Reserves together form a large western block of forest, totalling about 20,000 ha. To the east, the Forest Reserves of Lelan, Embotut, Kerrer, Kaisungor, Toropket, Chemurokoi, Kupkunurr, Cheboit, Sogotio and Kapchemutwa are less well connected. Apart from a large south-eastern block along the escarpment crest, the forests here are fragmented and separated by extensive natural grasslands, scrub and (especially in the central part) farmland.

The hills are composed of metamorphic rocks, with conspicuous quartzite ridges and occasional veins of marble. The soils are well drained and moderately fertile, and annual rainfall varies from around 1,200 mm in the east to at least 1,500 mm in the wetter west, which catches the moist prevailing winds from Lake Victoria.

The forests are of several different types (Beentje 1990). The lower western parts of Kiptaberr-Kapkanyar are clothed in *Aningeria–Strombosia-Drypetes* forest, with a large area of mixed *Podocarpus latifolius* forest on the higher slopes. The southern slopes hold *Juniperus–Nuxia–Podocarpus falcatus* forest, with heavily disturbed *Podocarpus falcatus* forest on the eastern slopes. Valleys in the upper peaks area shelter sizeable remnants of *Juniperus–Maytenus undata–Rapanea–Hagenia* forest. Tree ferns *Cyathea manniana* occur in stream valleys,

Regionally-threatened species

Lammergeier	Vulnerable	The hills shelter one of the last breeding populations in Kenya, nesting on the high peaks (S. Thomsett, *in litt.*)
African Crowned Eagle	Vulnerable	Widespread in small numbers
Red-chested Owlet	Vulnerable	Recently recorded in Kapkanyar (Waiyaki 1996)
Purple-throated Cuckoo-shrike	Vulnerable	Uncommon and local (Zimmerman *et al.* 1996); recent records from Kapkanyar (Waiyaki 1996)
Thick-billed Honeyguide	Vulnerable	Uncommon in forest interior (Zimmerman *et al.* 1996)


43 CHERANGANI HILLS
Lomut
Cherangani Hills
Chepareria
Kamatira
Lelan Forest
Makutano
Kapenguria
Kapkanyar
Kapolet
Kiptaberr
Embotut Forest
Tot
Saiwa National Park
Chesongoch
Kipkunurr Forest
Chesetan
Cherangani
Moi's Bridge
Chebeimit
Sogotio
Elegeyo Escarpment
Moiben
Soy
Singore
Sergoit
Kamnarock National Reserve
N
2400
3000
2100
Forest
National Park
National Reserve
River
Contour
Road
Town/Village
IBA Boundary
Railway
0 5 10
Kilometres

and there are patches of bamboo *Arundinaria alpina*, though no bamboo zone as such.

In clearings, *Acacia abyssinica* occurs among a scrubby grassland with a diversity of flowering plants. At higher altitudes, the forest is interspersed with a mixture of heath vegetation and swamps, the latter with *Lobelia aberdarica* and *Senecio johnstonii*. Much of this heathland may be maintained by burning and grazing (Mabberley 1975). Relict *Juniperus* and *Hagenia* trees occur here and there. Especially in the east, there is a mosaic of vegetation types with little obvious altitudinal zonation. Mabberley (1975) ascribed this to the hills' varied topography and the long history of cultivation, grazing and fire.

The Cherangani forests are important for water catchment, and sit astride the watershed between the Lake Victoria and Lake Turkana basins. Streams to the west of the watershed feed the Nzoia River system, which flows into Lake Victoria; streams to the east flow into the Kerio River system.

Birds

Forty-nine of Kenya's 67 African Highland biome species occur here (see Appendix 3). The avifauna of the Cheranganis is characteristic of the highland forests of Kenya west of the Rift Valley, which combine central highland species and western species. Ecological surveys have recorded over 73 forest-dependent species (Waiyaki 1996). No forest species in the Cheranganis is presently globally threatened; regionally-threatened species are shown in the box.

Other wildlife

The Bongo *Tragelaphus eurycerus*, a Red Data Book-listed species, has been recorded here in the past, but its current status is unknown. The butterfly *Capys juliae* is endemic to the Cherangani Hills (Larsen 1991). Two Giant Senecio taxa, *Senecio johnstonii battiscombei* var. *cheranganiensis* and *S. johnstonii battiscombei* var. *dalei*, are endemic to the Cheranganis. Two notable lobelias, *Lobelia deckenii elgonensis* and *Lobelia cheranganiensis*, are shared with Mt Elgon, as is *Alchemilla elgonensis*.

Conservation issues

The condition of many of the remaining forest blocks in the Cherangani Hills is relatively good, as indicated by the presence of many forest-dependent bird species (Waiyaki 1996). The wetter, western block is especially intact (Blackett 1994j). Nonetheless, there are a number of serious conservation problems. These include encroachment, de-gazettement for settlement, poaching of trees for building or charcoal burning, livestock grazing, and tree-felling by honey gatherers (for honey, or for manufacturing bee hives). Occasional fires, thought to be started by honey gatherers, also occur — one destroyed hundreds of hectares in Kapkanyar Forest in 1986. Most of the lower slopes of Kapolet Forest have been converted to farmland in the last twenty years, and similar threats face most of the forest blocks: sub-division and clearance of Kiptaberr Forest, facilitated by an unscrupulous Forest Department employee, was recently halted just before clear-felling began (Waiyaki 1996). Grazing is a major concern, especially in Kapkanyar, which borders land occupied by the pastoralist sub-group of the Pokot people. Hundreds of cattle are left to roam in the forest for the entire dry season period, causing enormous damage. As the population outside the forest increases, pasture land diminishes and pressure on the forest rises. Currently the small-scale farmers graze their cattle in pasture land outside the forest, and the large herds in the forests apparently belong to wealthy individuals who are influential locally (Waiyaki 1996). Embotut Forest has a long-standing squatter problem, with around 5,000 people living within the forest boundaries (Blackett 1994i).

These hills have tremendous potential for eco-tourism for those visiting the western and north-western part of Kenya. They are scenically beautiful, with undulating forested slopes, cascading rivers and open grasslands filled with wild flowers. Eco-tourism could help provide local employment and alternative sources of revenue for those living around the forest. The Forest Department needs to be better aware of the national and global significance of the Cherangani forests and to protect them more effectively. Education of the local people, especially with respect to bee-keeping, is important too, and can help to prevent forest fires and tree losses caused by honey gatherers. Honey collection, if properly controlled and managed, can be a sustainable use of the forest and indeed provide substantial incentives for habitat conservation.

Further reading

Hancock 1971, Cheke 1972, 1978, Mabberley 1975, Blackett 1994i,j, Young 1994, Waiyaki 1996

44 Lake Baringo

0°38'N, 36°05'E, Rift Valley Province, Baringo District
c. 28,400 ha, (lake 16,800 ha, surrounding area 11,600 ha)
Altitude: 975–1,070 m
Status: National Reserve and unprotected
Category: Somali-Masai biome species

Site description

The IBA includes Lake Baringo and its islands, the bushland within the 1,000 m depression contour surrounding the lake, and the striking cliffs to the west of Kampi ya Samaki. Baringo, a shallow freshwater lake, lies about 110 km north of Nakuru town. Its catchment is bordered by the Laikipia escarpment to the east and the Tugen Hills in the west. The maximum depth is only about 6 m, and the lake is becoming shallower through soil erosion in the surrounding land. Rainfall is about 650 mm per year. The area around the western shore is mainly *Acacia tortilis* woodland, with small bush-covered hills, gorges and cliffs. *Ficus* spp. grow on the cliff faces. The north and east have denser bush, thinning out towards the south, dominated by *Acacia mellifera*, *A. reficiens* and species of *Boscia*, *Commiphora*, *Terminalia* and *Balanites*. The open, flat southern part is bushland interspersed with dry river beds and stands of *Acacia tortilis* and *A. elatior*. Swampy wetlands, with *Typha* reeds and *Echinochloa* marsh grass, occur at the mouths of rivers draining into the lake, notably the Ndau, Molo and Mukutan, and much of the shore is lined with Ambatch *Aeschynomene* sp. The lake supports an important fishery and is a major tourist destination.

Birds

See Appendix 3 for key species. Thirty-five of Kenya's Somali-Masai biome species occur, including several found at few other sites. Notable species include the uncommon Jackson's and Hemprich's Hornbills, the latter frequenting the cliffs, and Bristle-crowned Starling. Baringo is a well-known destination for birdwatchers and over 300 bird species have been recorded. A colony of up to 20 Goliath Herons has nested on one of the islands in the lake. While the diversity of waterbirds is considerable, total numbers are usually only in the low thousands (e.g. Bennun 1992a). Species of global conservation concern include Lesser Kestrel (vulnerable; a passage migrant in small flocks), Lesser Flamingo (near-threatened; an occasional visitor, usually on passage), Madagascar Squacco Heron (near-threatened; a rare non-breeding visitor) and Pallid Harrier (near-threatened; a regular passage migrant). A number of regionally-threatened species are also recorded (see box).

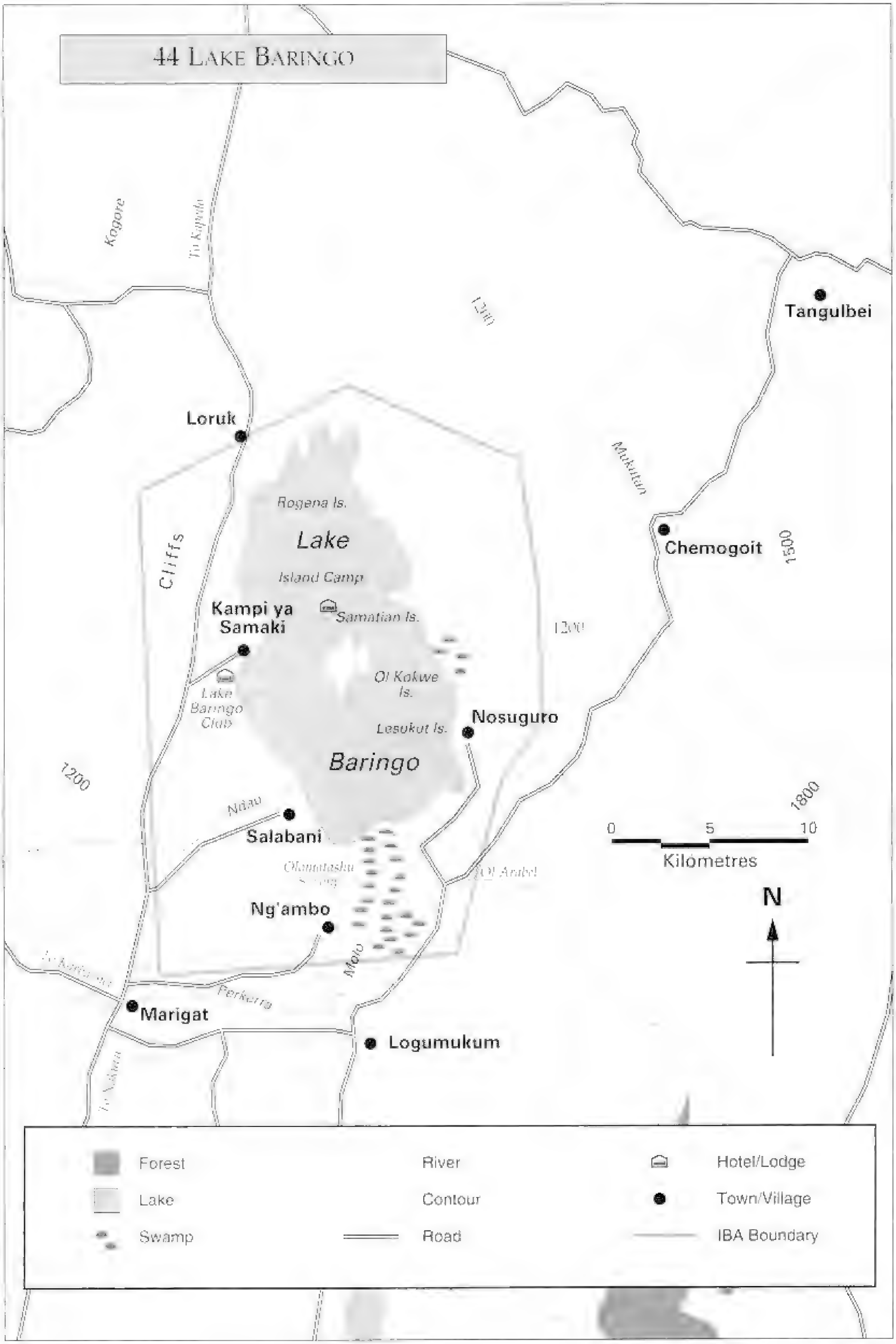
Other wildlife

The lake supports large populations of Nile Crocodile *Crocodylus niloticus* and Hippopotamus *Hippopotamus amphibius*. An apparently range-restricted snake, the Lake Baringo Snake *Coluber kenensis*, is known from only one specimen collected here (Spawls 1978). Little is recorded about the other wildlife values of the area.

Conservation issues

The main conservation issue in Baringo District is land degradation. This has a long history, being documented as early as 1928. Before the colonial period, livestock numbers were kept at relatively low levels by diseases and stock theft. These forces have

Hemprich's Hornbill


44 LAKE BARINGO
Kogore
Tangulbei
Loruk
Mukutan
Rogena Is.
Lake
Baringo
Cliffs
Island Camp
Chemogoit
1500
Kampi ya Samaki
Samatian Is.
1200
Ol Kokwe Is.
Lake Baringo Club
Lesukut Is.
Nosuguro
1200
1800
Ndau
Salabani
0
5
10
Kilometres
N
Ng'ambo
Molo
Perkerra
Marigat
Logumukum
Forest
Lake
Swamp
River
Contour
Road
Hotel/Lodge
Town/Village
IBA Boundary

Regionally-threatened species

Great Crested Grebe	Critical	No recent records
African Darter	Vulnerable	Small numbers resident, has bred on Ndau Island in the lake
Great Egret	Vulnerable	Regular, up to 100 recorded (Stevenson 1980)
Saddle-billed Stork	Vulnerable	Occasional visitor
White-backed Duck	Vulnerable	Occasional visitor
White-headed Vulture	Vulnerable	Occasional visitor
Martial Eagle	Vulnerable	Occasional visitor
Baillon's Crake	Vulnerable	Irregular visitor
African Skimmer	Vulnerable	Irregular visitor

Data from Stevenson (1980), Zimmerman et al. *(1996)*

been checked since then, and livestock numbers have steadily increased. Overstocking and high grazing pressures have reduced ground cover and encouraged soil erosion. Excessive tree-cutting is a related problem: in many areas *Acacia reficiens*, which is unpalatable to livestock and inhibits the growth of other plants, has replaced the original trees and shrubs. Extensive clearing of large trees for charcoal has seriously degraded some of the most important and well-known birdwatching areas, and changed the nature of the local avifauna.

These environmental changes have contributed to periodic flooding that causes massive episodes of erosion, with most of the soil being washed down into Lake Baringo. The lake is much more turbid than in past years and fish stocks have declined. Excessive offtake of water from the Molo River in its catchment is also a problem, since it has greatly reduced the amount of water reaching the lake.

Many environmental projects have attempted to solve these problems, but most have been conspicuously unsuccessful. One of the more promising attempts is the Baringo Fuel and Fodder Project, which started in 1981, and until recently was funded by the Netherlands government. It aims at rehabilitating parts of the degraded western shores. By 1992 the project had managed to rehabilitate 1,500 ha, by creating ploughed surfaces to trap water and replanting with grasses and trees in fenced-off plots.

The lake and part of its hinterland are now a National Reserve under the management of the Baringo County Council. However, this move has not been unanimously welcomed by local residents and hotel-keepers, some of whom claim that the County Council collects gate fees but does little to deal with pressing conservation concerns. Baringo's eco-tourist potential is already being exploited. This needs to be better tied in to the local economy, so that those living around the lake have more of a stake in conserving its special birds and their habitats.

Further reading

Stevenson 1980, Hartley 1986, Otieno & Rowntree 1986, Gitogo 1993

45 Lake Bogoria National Reserve

0°15'N, 36°06'E, Rift Valley Province, Koibatek and Baringo Districts

10,700 ha, (lake c. 3,000 ha, maximum 4,250 ha)

Altitude: 1,000–1,600 m

Status: National Reserve

Categories: Globally-threatened species, congregations

Site description

Bogoria is a narrow, shallow, alkaline lake (maximum depth 8.5 m) on the Rift Valley floor. To the east, the Siracho escarpment rises abruptly from the lakeshore, while on the relatively flat western shore is a series of spectacular hot springs and geysers. The reserve was gazetted in 1981 and includes the entire lake and its immediate surroundings. The water (pH c. 10.0, conductivity 10,000–70,000 µS/cm) usually supports a dense bloom of the cyanophyte *Spirulina* sp. The terrestrial vegetation is mainly thorny bushland, dominated by species of *Acacia*, *Balanites* and *Commiphora*, with patches of riverine woodland containing *Ficus capensis*, *Acacia xanthophloea* and *A. tortilis*. The open shore, often littered with lava boulders, is dominated by alkaline-tolerant grasslands of *Sporobolus spicatus*, with the sedge *Cyperus laevigatus* around the hot springs. The lower slopes of the Siracho escarpment are covered by *Combretum* and *Grewia* thicket. The lake is fed by its springs and by the Sandai (or Waseges) River, which rises on the eastern scarp of the Rift Valley. The Sandai flows past the lake and then turns through 180° to enter it from the north through the Kisibor Swamp, a sizeable freshwater wetland dominated by *Typha*.

Black-necked Grebe

Birds

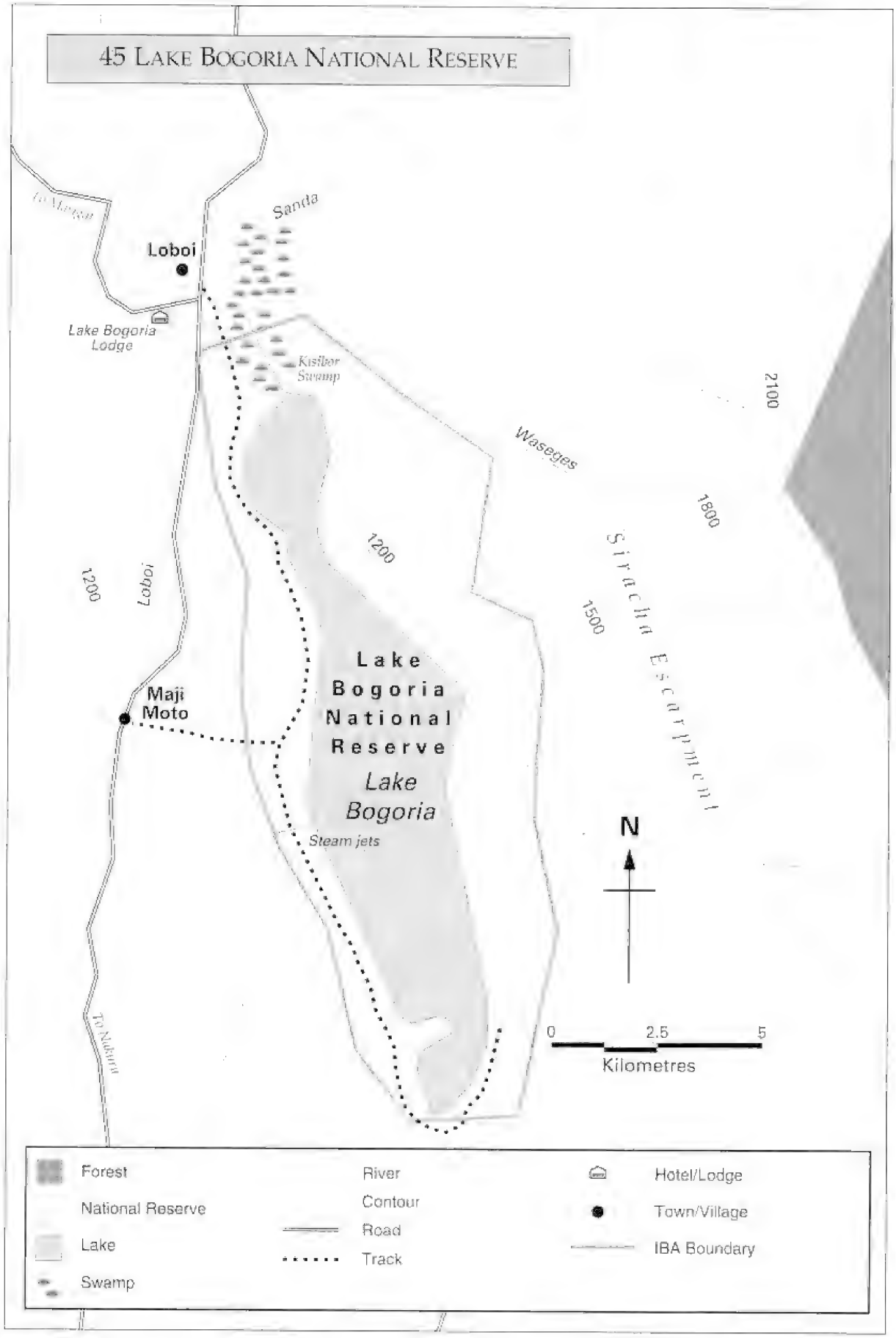
See box for key species. Bogoria is a key feeding ground for the itinerant Rift Valley population of the near-threatened Lesser Flamingo. Spectacular congregations (estimated at up to 2 million birds) occur at times, and several hundred thousand birds are often present. Black-necked Grebe and Cape Teal are usually present in good numbers. Thirty-one of Kenya's 97 Somali–Masai biome species occur in the bushland and woodland around the lake (Appendix 3). Other species of global conservation concern recorded at Bogoria include Pallid Harrier (near-threatened; occurs on passage) and Lesser Kestrel (vulnerable; also occurs on passage in small numbers).

Other wildlife

Apart from the enormous concentrations of flamingos, another reason for designating Lake Bogoria as a National Reserve was the presence of the rare Greater Kudu *Tragelaphus strepsiceros*.

Conservation issues

Lake Bogoria is spectacular. The extraordinary hot springs and geysers, the rugged faulted landscape, the huge numbers of flamingos and the chance of seeing Greater Kudu are great attractions for visitors. At present, tourists exert no obvious pressure on the environment at Bogoria. The reserve is managed by the Koibatek and Baringo County Councils but its existence is not free of controversy, with some local people claiming that they are not benefiting adequately from the income that


45 Lake Bogoria National Reserve
To Marigat
Loboi
Sanda
Lake Bogoria Lodge
Kisibor Swamp
Waseges
2100
1800
1200
1500
1200
Loboi
Siracha Escarpment
Maji Moto
Lake Bogoria National Reserve
Lake Bogoria
Steam jets
N
0
2.5
5
Kilometres
To Nakuru
Forest
National Reserve
Lake
Swamp
River
Contour
Road
Track
Hotel/Lodge
Town/Village
IBA Boundary

Globally-threatened species

Lesser Flamingo	Near-threatened	A key feeding site for this species; numbers fluctuate less than on other Rift Valley lakes. Although large numbers of very young birds may be present at times, this species has not bred successfully here (Brown 1973, Bennun 1993, Nasirwa & Bennun 1994, 1995, unpubl. data)

Regionally-threatened species

Great Crested Grebe	Critical	No recent records
African Darter	Vulnerable	Has occurred in swamp to north of lake
Maccoa Duck	Vulnerable	No recent records
White-backed Duck	Endangered	No recent records
White-headed Vulture	Vulnerable	Status uncertain
Martial Eagle	Vulnerable	Probably resident

From Hartley (1986), Zimmerman et al. *(1996)*

it generates. A symptom of this is that cattle grazing and human settlement have recently become evident within the reserve's boundaries and are steadily increasing. Mass deaths of Lesser Flamingos have occurred in recent years, apparently due to infection with the bacterium *Pseudomonas aeruginosa* (Oyugi 1994); this seems to be a natural phenomenon and not cause for great alarm.

Further reading

Tuite 1979, 1981, Hartley 1986, Burgis & Mavuti 1987, Oyugi 1994, Njuguna 1996

Congregations

More than 20,000 waterbirds	1992–1997 January mean: 425,600; max: 874,000 (1994); 1.5 million estimated July 1994 (Nasirwa & Bennun 1995).
1% or more of biogeographic population	
Greater Flamingo (1,250)	1992–1997 January mean: 4,400; max: 10,700 (1995)
Lesser Flamingo (20,000)	1992–1997 January mean: 415,400; max: 865,000 (1994). 1.5 million estimated in a ground count on 23 July 1994 (Nasirwa & Bennun, 1995)
Black-necked Grebe (250)	1992–1997 January mean: 1,600; max: 3,700 (1997)

Except where shown, all data from the annual January waterbird census (Nasirwa & Bennun 1994, 1995, unpubl. data)

46 Lake Elmenteita

0°27'S, 36°15'E, Rift Valley Province, Nakuru District
6,300 ha, (1,800 ha lake, 4,500 ha Soysambu Wildlife Sanctuary)
Altitude: 1,775–1,950 m
Status: Part unprotected, part private wildlife sanctuary
Categories: Globally-threatened species, restricted-range species, congregations

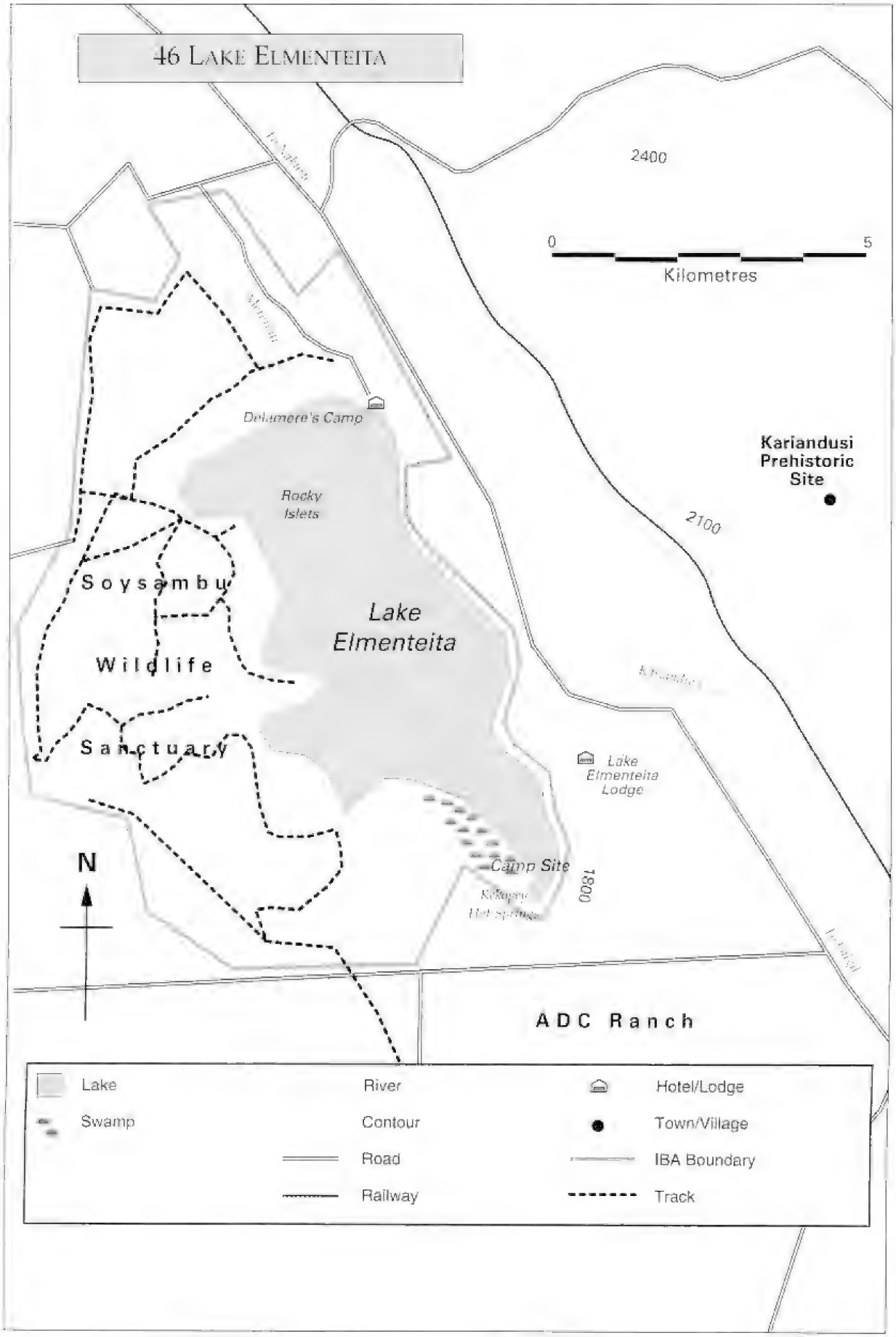
Site description

Elmenteita is a shallow alkaline lake (maximum depth 1.9 m) lying on the Rift Valley floor some 20 km south-east of Nakuru town. It is fed by the Kekopey hot springs at its southern end, and two small streams, the Mereroni and Kariandusi, flowing from the eastern plateau. The surrounding landscape is characterised by dramatic rocky faults, volcanic outcrops and cones. Rainfall is erratic and less than 600 mm on average per year. To the east, the lake is flanked by small-scale agriculture, while several large ranches surround the remainder. The northern and south-eastern lakeshores are open and flat, a spectacular cliff rises to the north-east, and the western shores are broken and rocky. The natural vegetation is mainly *Acacia* and *Tarchonanthus camphoratus* bushland interspersed with *Themeda triandra* grassland. Patches of *Acacia xanthophloea* woodland occur near the shore, and formerly covered a large area south of the lake. The IBA consists of the lake and its surrounding shoreline, including the hot springs and the cliffs, and the Soysambu Wildlife Sanctuary (part of the Delamere Estate) that abuts the lake to the north and west.

Greater Flamingo

Birds

See box for key species. The threatened, restricted-range Grey-crested Helmet-shrike occurs in the surrounding woodland, and Jackson's Widowbird nests in the grassland. The lake consistently holds internationally important populations of Greater and Lesser Flamingo and Pied Avocet. At least 49 waterbird species are recorded, including 10 Palaearctic migrants. Although it lacks fish, except in the peripheral hot springs, Elmenteita at times is also host to large numbers of Great White Pelicans. Up to 8,000 pairs have bred there (Brown 1973, Richards 1991) when water levels are high and rocky outcrops in the eastern sector are flooded to form islets, on which the birds can safely nest. The pelicans move daily to Lake Nakuru (IBA 49) to feed. Greater Flamingos have also bred at Elmenteita in the past, but have been displaced by pelicans in recent years. There have been occasional, but unsuccessful, breeding attempts by the near-threatened Lesser Flamingo (Brown 1973). The woodland and bushland are rich in birdlife (over 400 species have been recorded), particularly raptors. As well as the species shown in the box, Lesser Kestrel (vulnerable) occurs on passage, and vagrant Greater Spotted Eagle (vulnerable) and Red-throated Tit (near-threatened) have been recorded (D.A. Turner, *in litt.*).


46 Lake Elmenteita
2400
0
5
Kilometres
Delamere's Camp
Rocky Islets
Soysambu
Wildlife
Sanctuary
Lake Elmenteita
Kariandusi Prehistoric Site
2100
Lake Elmenteita Lodge
Camp Site
1800
N
ADC Ranch
Lake
Swamp
River
Contour
Road
Railway
Hotel/Lodge
Town/Village
IBA Boundary
Track

Congregations

More than 20,000 waterbirds	1992–1997 January mean: 171,000. Max: 486,000 (1994)
1% or more of biogeographic population	
Black-necked Grebe (250)	3,000 in January 1990 (M.A.C. Coverdale, *in litt.*)
Great White Pelican (1,800)	11,800 in January 1992, 1,900 in January 1997
African Spoonbill (150)	260 in January 1994
Greater Flamingo (1,250)	1992–1997 January mean: 9,100; max: 23,800 (1993)
Lesser Flamingo (20,000)	1992–1997 January mean: 150,100; max: 466,600 (1994)
Pied Avocet (250)	1992–1997 January mean: 2,200; max: 4,200 (1997)

Except where shown, data from the annual January waterbird census (Bennun 1992a, Nasirwa & Bennun 1994, 1995, unpubl. data)

Other wildlife

Soysambu holds good populations of large mammals, including an introduced population of Rothschild's Giraffe *Giraffa camelopardalis rothschildi*. The Kenya Horned Viper *Bitis worthingtonii*, endemic to the central Rift Valley above 1,500 m, is known from here (Spawls 1978).

Conservation issues

Private ranches, including the Soysambu Wildlife Sanctuary, cover about 75% of the shoreline, and this portion is generally well protected. Subsistence farming on the eastern side is leading to increased siltation of the lake from soil erosion, while increased offtake from the Mereroni stream is reducing water inflows. There has been very substantial destruction of the *Acacia xanthophloea* woodland on the south-eastern shores. Overgrazing on the ranchland during periods of drought, particularly in the south-eastern sector, accelerates erosion after heavy rain. Soda extraction and sand-mining on the eastern shores are limited in scale at present but may be a serious problem in future.

Tourism at Elmenteita is increasing, the main attractions being the scenery, birdwatching and the chance to see unusual animals by night (night driving is not permitted in National Parks). There is a tourist lodge (Lake Elmenteita Lodge) on the escarpment above the lake and a tented camp (Delamere's Camp) in the Soysambu Wildlife Sanctuary. At the moment tourism exerts little pressure on the lake, and is a force for its conservation.

Globally-threatened species

Lesser Flamingo	Near-threatened	Usually present in tens or hundreds of thousands (see below); has attempted nesting (Brown 1973)
*Grey-crested Helmet-shrike	Vulnerable	Several recent records in woodland; may be resident (Bennun 1994c)
*Jackson's Widowbird	Near-threatened	A seasonal visitor that nests in tall grassland

**also restricted-range species*

Regionally-threatened species

Great Crested Grebe	Critical	Several pairs have nested recently (Ornithology Dept., unpubl. data)
Great Egret	Vulnerable	An important non-breeding site for this species, with regularly more than 50 and as many as 156 counted in January 1994 (Nasirwa & Bennun 1994)
White-headed Vulture	Vulnerable	
Ayres's Hawk Eagle	Vulnerable	
African Crowned Eagle	Vulnerable	
Martial Eagle	Vulnerable	
Yellow-billed Oxpecker	Vulnerable	
Long-tailed Widowbird	Vulnerable	(Zimmerman *et al.* 1996)

Except where shown, species listed in Oyugi et al. *(1993), but without information on status*

Further reading

Brown 1973, Vareschi 1978, Lincer *et al.* 1981, National Biodiversity Unit 1991, Hughes & Hughes 1992

47 Lake Magadi

01°52'S, 36°17'E, Rift Valley Province, Kajiado District

10,500 ha

Altitude: 580 m

Status: Unprotected; part private land

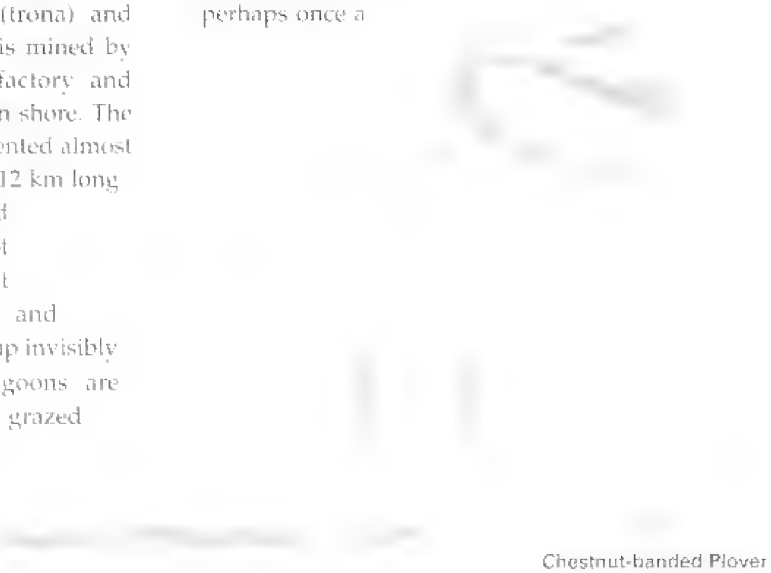
Category: Congregations

Site description

This is a shallow alkaline lake, its surface largely covered by crusts of sodium carbonate, 85 km south-west of Nairobi in a low-lying basin on the floor of the Rift Valley. Extensive surface water is present only after heavy rains over the local catchment, when run-off reaches the northern end of the lake via three wadis. Most of the lake is a vast expanse of solid sodium carbonate (trona) and allied salts, some 15–30 m thick. This is mined by the Magadi Soda company, whose factory and associated town are on the north-eastern shore. The lake's main basin is 29 km wide and oriented almost due north-south; the north-west arm is 12 km long and 2.5 km wide. The lake is surrounded and fed with water by a number of hot springs that feed shallow, permanent lagoons at the northern, southern and western extremities (other springs well up invisibly below the surface). These warm lagoons are carpeted with cyanophytes, which are grazed upon by shoals of the fish *Oreochromis alcalicus grahami*. The climate is inhospitably hot and arid (mean maximum temperatures c. 35°C, rainfall around 400 mm per year), and the vegetation surrounding the lake is sparse, open bushland.

Birds

See box for key species. Birdlife is concentrated at the lagoons. The near-threatened Lesser Flamingo is often present in internationally-important numbers, though Magadi is a much less significant feeding site for this species than Bogoria (IBA 43) or Nakuru (IBA 49). Very large numbers of this species may breed here on rare occasions, perhaps once a

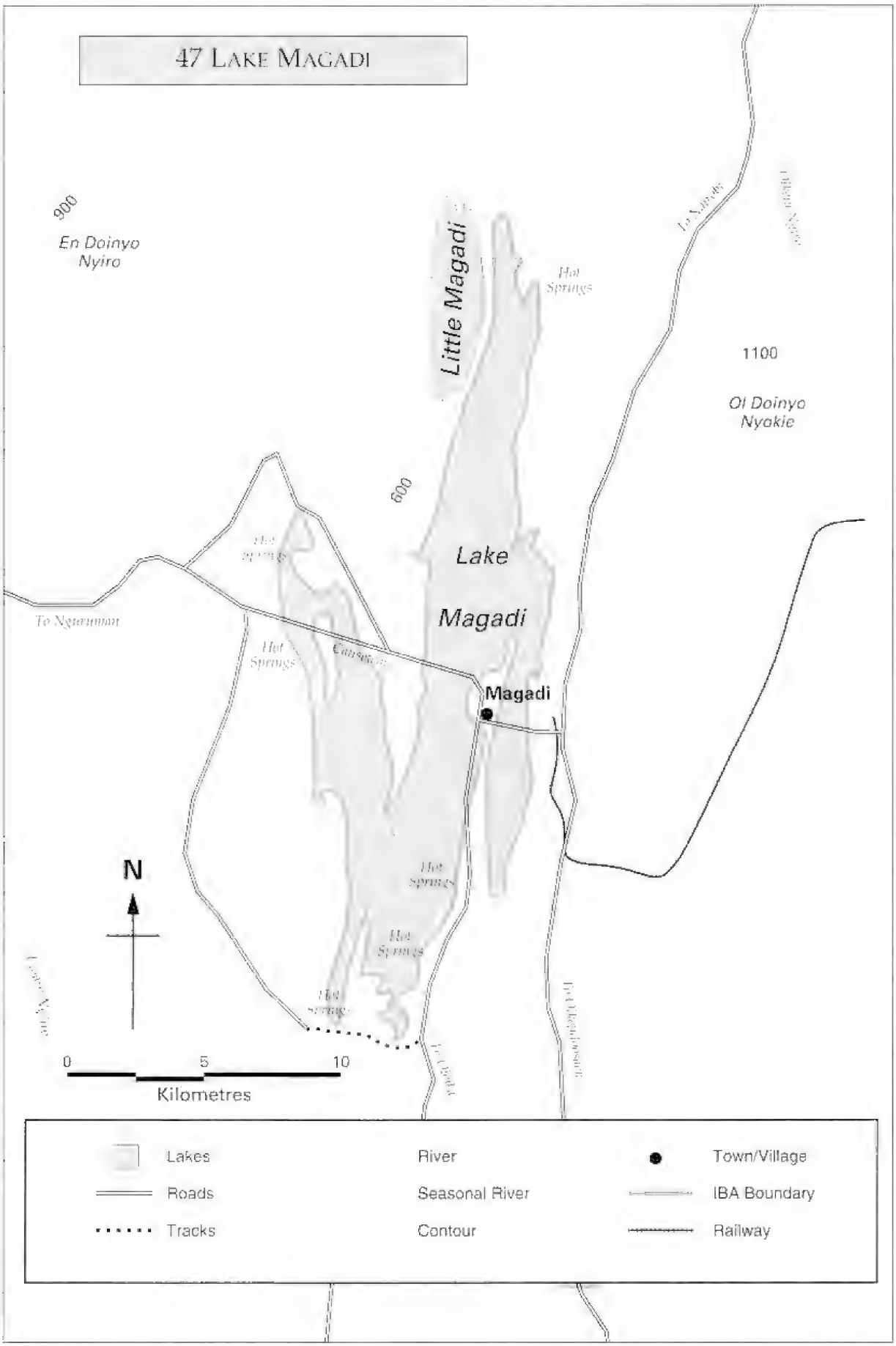


Chestnut-banded Plover

Congregations

More than 20,000 waterbirds	Mean: 25,800 (1992–1997, five January counts); max: 45,000 (January 1993); 50,000+ counted from the air, July 1994
1% or more of biogeographic population	
Lesser Flamingo (20,000)	Mean: 25,450 (1992–1997, one July and five January counts); max: 50,000 (aerial count, July 1994)

Data from the annual January and July waterbird census (Bennun 1992a, Bennun 1993, Nasirwa & Bennun 1994, 1995, unpubl. data)


47 Lake Magadi
900
En Doinyo Nyiro
Little Magadi
Hot Springs
1100
Ol Doinyo Nyokie
600
Lake Magadi
To Nguruman
Causeway
Magadi
N
0
5
10
Kilometres
Lakes
Roads
Tracks
River
Seasonal River
Contour
Town/Village
IBA Boundary
Railway

Regionally-threatened species		
Great Egret	Vulnerable	Occasional visitor

century (Brown 1973): the last such event was in July 1962, when over a million pairs were nesting. A good variety of other waterbirds is present, including a sizeable resident population of Chestnut-banded Plover. Other birds nesting at Magadi include African Spoonbill, Cape Teal, Avocet and Black-winged Stilt. Many Palaearctic migrant waders winter here too, notably Little Stint. The bushland around the lake supports 28 of Kenya's 92 Somali-Masai biome species.

Conservation issues

The lake is unprotected and is commercially mined for sodium carbonate (which appears to be replenished at least as fast as it is removed: e.g. Crees 1985). Removal of trona takes place from an area not used by waterbirds, and appears to have minimal impact on wildlife. Magadi faces no obvious conservation problems at present.

Further reading

Brown 1973, Crees 1985, Hughes & Hughes 1992

48 Lake Naivasha

0°46'S, 36°21'E, Rift Valley Province, Nakuru District

23,600 ha (15,600 ha lake, c. 7,000 ha woodland)

Altitude: 1,890 m

Status: Ramsar site (no other formal protection); surrounding land privately-owned

Categories: Globally-threatened species, restricted-range species, congregations

Site description

This site lies on the floor of the Rift Valley, 80 km north-west of Nairobi, and consists of a shallow freshwater lake and its fringing *Acacia* woodland. Lake Naivasha is of recent geological origin, and is ringed by extinct or dormant volcanoes, including Mts Longonot, Ol Karia and Eburu. Naivasha's water is supplied by the permanent Malewa and Gilgil rivers, which respectively drain the Aberdare Mountains (IBA 1) and the Rift Valley floor to the north, by the seasonal Karati River (also draining from the Aberdares) and from substantial ground-water seepage. The Malewa covers 1,730 km^2 of the 2,800 km^2 catchment, and contributes 90% of the surface water entering the lake. Naivasha has no surface outlet. It is thought that a combination of underground outflow and sedimentation of salts keeps the lake fresh, unlike other endorheic lakes in the eastern Rift Valley.

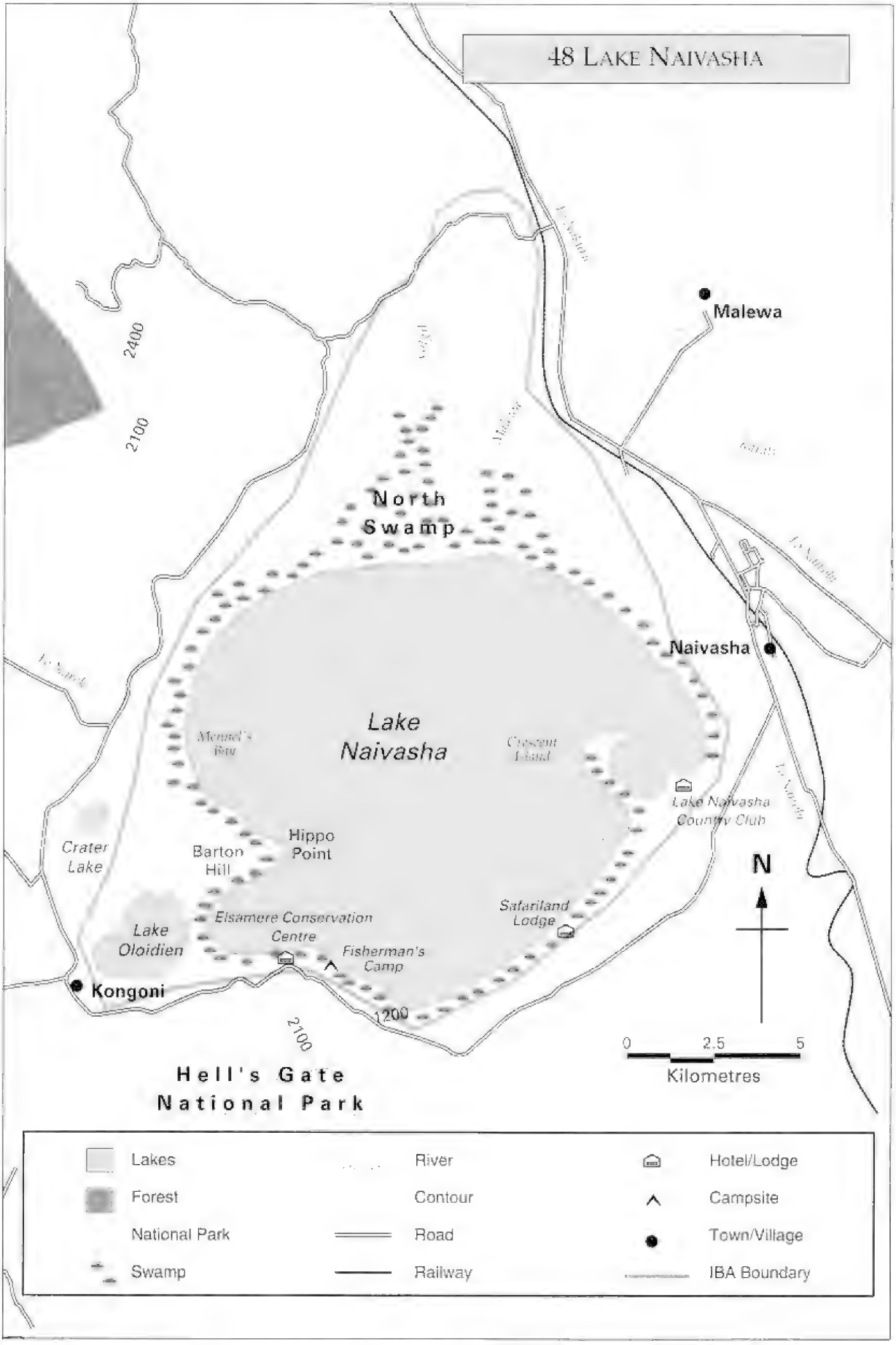
Naivasha includes three chemically distinct water bodies. The main lake (about 15,000 ha, max. depth c. 8 m) incorporates a partially-submerged crater, the Crescent Island lagoon (max. depth c. 18 m), at its eastern end. The lagoon is largely isolated at low water levels. To the south-east, separated by Papyrus *Cyperus papyrus* swamp and an isthmus of *Acacia* woodland, is the small (c. 350 ha), somewhat alkaline Lake Oloidien. Papyrus fringes the main lake's shore (with scatterings of other sedges and *Typha*) and cloaks the inlets of the Gilgil and Malewa Rivers. There are large floating, wind-driven rafts of the exotic Water Hyacinth *Eichhornia crassipes*, usually concentrated in the south-west sector. Submerged macrophytes (including *Potamogeton* spp. and *Naja pectinata*) sometimes occur in large beds, mainly in the shallow eastern part, but these vary greatly in extent. The shores of Crescent Island lagoon are steep and rocky or flat and muddy,

Red-knobbed Coot

Globally-threatened species

*Grey-crested Helmet-shrike	Vulnerable	A few records from the woodlands around the lake (Lewis 1983), especially to the north. It is probably resident in small numbers (T. Stevenson, *in litt.*)
Basra Reed Warbler	Near-threatened	Winter visitor and passage migrant: exact status unknown

**also restricted-range species*


48 Lake Naivasha
Malewa
2400
2100
North Swamp
Naivasha
Lake Naivasha
Mennel's Bay
Crescent Island
Lake Naivasha Country Club
Crater Lake
Barton Hill
Hippo Point
Elsamere Conservation Centre
Safariland Lodge
Lake Oloidien
Fisherman's Camp
Kongoni
1200
2100
Hell's Gate National Park
N
0
2.5
5
Kilometres
Lakes
Forest
National Park
Swamp
River
Contour
Road
Railway
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

Congregations

More than 20,000 waterbirds	1991-1997 mean: 22,000; max: 30,600 (1991)
1% or more of biogeographic population	
Red-knobbed Coot (5,000)	1991–1997 mean: 6,500; max: 19,400 (1991)
African Spoonbill (150)	1991–1997 mean: 180; max: 412 (1997)
Little Grebe (300)	1991–1997 mean: 730; max: 1,500 (1997)

Data from the annual January waterbird counts (Bennun 1992a; Bennun 1993; Nasirwa & Bennun 1994, 1995, unpubl. data)

while Oloidien has an open, grassy shoreline, with no emergent or floating macrophytes.

The lake's levels fluctuate enormously, and Naivasha has been dry within historic times. The surrounding riparian land is almost all privately owned, much of it now used for intensive horticulture and floriculture using water from the lake. A belt of tall *Acacia xanthophloea* woodland fringes the lake and extends along the rivers to the north, though portions have been cleared for farming; further from the water this gives way to dry open grassland, *Tarchonanthus camphoratus* scrub and (on rocky hillsides) *Euphorbia* forest. Naivasha is the second site listed by Kenya as a Wetland of International Importance under the Ramsar Convention.

Birds

See box for key species. The woodland around the lake provides habitat for the globally threatened Grey-crested Helmet-shrike, which has been recorded here regularly, once with newly fledged young (T. Stevenson, *in litt.*). The lake itself supports a diverse waterbird community, with more than 80 species regularly recorded during censuses. Depending on water levels, it can be a significant site for Red-knobbed Coot, African Spoonbill and Little Grebe. Many species of duck and Palaearctic waders also occur in numbers; Palaearctic duck are especially abundant in November and February. The near-threatened Lesser Flamingo occurs in small numbers at times, mainly on Oloidien. The lake is known for its high density of African Fish Eagles, which nest in the surrounding *Acacia* woodland.

Other wildlife

The lake supports a large and expanding population of Hippopotamus *Hippopotamus amphibius* (around 300 individuals at present). The Kenya Horned Viper *Bitis worthingtonii*, endemic to the central Rift Valley above 1,500 m, is recorded from Naivasha (Spawls 1978).

Conservation issues

The conservation issues surrounding Naivasha are particularly complex and tangled, with the effects of human pressures superimposed on a naturally variable system.

The lake has seen dramatic ecological changes through the effects of introduced species. In the 1960s and 1970s, Coypu *Mycocaster coypu* (now probably extinct) and Louisiana Red Crayfish *Procambarus clarkii* ate their way through the lake's submerged plants and extensive beds of water lilies (*Nymphaea* sp., now almost vanished). The floating plant *Salvinia molesta*, a problem in the 1980s, was replaced in the 1990s by the notorious Water Hyacinth *Eichhornia crassipes*. *Eichhornia* appears to provide excellent shelter for young and adult crayfish, contributing to a crustacean population boom that is preventing any recovery of the submerged macrophytes (D.M. Harper, *in litt.*). This in turn has negative effects on several bird species, notably the Red-knobbed Coot, numbers of which have declined dramatically.

All the lake's five fish species are introduced. Two tilapias (*Oreochromis leucostictus* and *Tilapia zillii*) and the predatory Largemouth Black Bass *Micropterus salmoides* support a once-productive fishery. Much fishing goes on illegally, often with small-mesh gill-nets that catch under-sized fish, and over-exploitation has caused fish populations to slump. Gill-netting itself is a cause of high mortality in diving birds such as Great Crested Grebe and

African Darter. These two regionally-threatened species, once common on the lake, have nearly vanished: most recent records are from Lake Oloidien, which is not fished.

Increasing human pressures are the major threat to Naivasha. In the last decade the area has seen an extraordinary explosion of horticulture and floriculture for the European export market. The climate and soils, and the ready supply of irrigation water, are ideal for intensive production of cut flowers and crops such as green beans. Large areas of woodland and fringing swamp have been cleared, with cultivation sometimes extending right down to the lake edges. Irrigated agriculture extracts large quantities of water from the lake, as does the nearby geothermal power plant at Ol Karia.

Agriculture and water offtake in the catchment have also intensified greatly. Water extraction may now exceed replenishment, although no adequate water budget is available. Matters would be made much worse by Government plans to build a reservoir high in the catchment to supply water to Nakuru town, in the adjacent watershed. The first phase of this scheme, the Turasha weir, is already in place.

Intensified cultivation and the removal of fringing swamps, the lake's natural water filter, has increased the amount of sediment and nutrients (along with potentially hazardous agricultural chemicals) reaching the lake. Turbidity and algal biomass increased rapidly throughout the 1980s, although there has been some stabilisation in the last few years (D.A. Harper, *in litt.*).

Annual waterbird counts show an overall decline in numbers over the years 1990–1997. In particular, steady and alarming declines are visible in Red-knobbed Coot, kingfishers and birds of prey (especially African Fish Eagles) (Bennun & Nasirwa,

Regionally-threatened species

Great Crested Grebe	Critical	Most recent Kenyan records of this scarce species, which has been severely reduced by gill-netting, are from Oloidien, with seven birds seen in January 1996
Maccoa Duck	Endangered	Regular on Oloidien, with 170 in January 1994 and January 1997
African Darter	Vulnerable	Severely reduced by gill-netting, it survives in very small numbers; one recorded on Oloidien in January 1997
Great Egret	Vulnerable	Regular at Naivasha, which is an important feeding site; 73 counted in January 1997
Saddle-billed Stork	Vulnerable	Resident in very small numbers; two counted in January 1997
White-backed Duck	Vulnerable	Occasional; 12 counted on Oloidien in January 1994
Baillon's Crake	Vulnerable	Status uncertain
African Skimmer	Vulnerable	Irregular visitor

All data from the January waterbird counts (Bennun 1992a; Bennun 1993; Nasirwa & Bennun 1994, 1995, unpubl. data)

in press). The fish eagle population has halved since the 1970s. Many birds are severely under-weight, and reproductive success has declined dramatically, suggesting that the birds have problems finding sufficient food (Virani *et al.* 1997). As fish eagles frequently fed on coots when these were abundant at the lake (e.g. Higgins 1994), their decline may partly be connected to the decline in Red-knobbed Coot numbers. This in turn is due to the reduced area of submerged macrophytes, and also possibly to habitat loss on their breeding grounds (Bennun & Nasirwa, in press). It is unclear why kingfisher numbers are declining.

With spectacular scenery, a fine climate, tranquil surroundings and easy access, Naivasha is already an important site for local and international tourism. Visitors come for bird watching, hippo viewing and watersports, and to visit the nearby National Parks of Hell's Gate and Longonot. The challenge is to reconcile the needs of conservation and the tourism industry with the other uses of the lake — which generate large amounts of employment, foreign exchange and badly-needed electricity.

Administratively the lake is entirely within Naivasha town, but almost all the land around it is privately owned. The Ministry of Water Development and Department of Fisheries are in charge of controlling water and fish exploitation, respectively, but it is the riparian land-owners who can contribute most to management efforts. The Lake Naivasha Riparian Association was instrumental in having Naivasha declared a Ramsar site in 1995, and in drawing up a comprehensive management plan that was accepted by Government in 1997. This major step forward gives encouragement that the lake can be managed wisely for multiple uses.

The woodland north of the lake has generally been well conserved by land-owners, who farm under the trees in some cases. Elsewhere, large tracts have been cut to make way for green-houses. The status of the Grey-crested Helmet-shrike here is unclear, and a survey should be undertaken urgently.

Further reading

Harper 1984, 1987, 1992, Tarras-Wahlberg 1986, Burgis & Mavuti 1987, Harper *et al.* 1990, 1993, 1995, Tyler 1991, Henderson & Harper 1992, Harper & Mavuti 1996, Bennun & Nasirwa, in press

49 Lake Nakuru National Park

0°22'S, 36°05'E, Rift Valley Province, Nakuru District

18,800 ha (lake 3,300 ha)

Altitude: 1,750–2,070 m

Status: National Park and Ramsar site

Categories: Globally-threatened species, restricted-range species, congregations

Site description

A very shallow, strongly alkaline lake, with surrounding woodland and grassland. Set in a picturesque landscape, the Park abuts Nakuru town, an important and expanding agricultural and industrial centre. The lake catchment is bounded by Menengai Crater to the north, the Bahati Hills to the north-east, the Lion Hill ranges to the east, Eburu Crater to the south and the Mau escarpment to the west. Three major rivers, the Njoro, Makalia and Enderit, drain into the lake, together with treated water from the town's sewage works and the outflow from several springs along the shore.

Nakuru was first gazetted as a bird sanctuary in 1960 and upgraded to National Park status in 1968. A northern extension to the park was added in 1974. The foundation of the lake's simple food chains is the cyanophyte *Spirulina platensis*, which often occurs as a unialgal bloom. At such times it can support huge numbers of Lesser Flamingos and the fish *Oreochromis alcalicus grahami* (introduced in 1960 from Lake Magadi, IBA 47, to curb mosquitoes). The fish in turn support a number of secondary consumers.

The lake shores are mainly open alkaline mud, with areas of sedge *Cyperus laevigatus* and *Typha* marsh around the river inflows and springs, giving way to grassland and a belt of *Acacia xanthophloea* woodland. Rocky hillsides on the park's eastern perimeter are covered with *Tarchonanthus* scrub and magnificent *Euphorbia* forest.

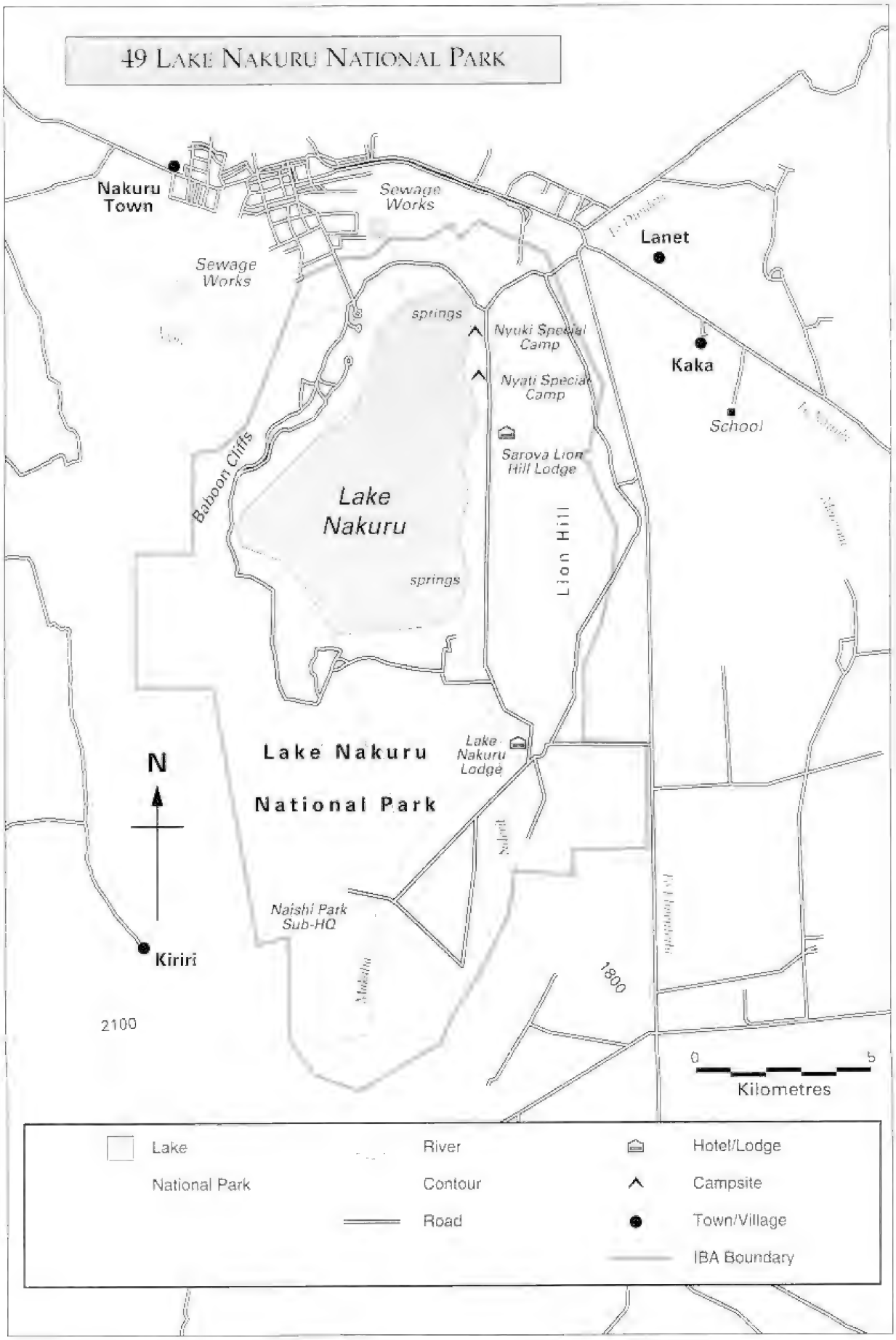
Birds

See box for key species. The lake is internationally famous for its populations of Lesser Flamingo; numbers can reach 1.5 million at times, though drastic and unpredictable fluctuations occur. Undoubtedly Nakuru is a very important feeding site for this species; attempts by flamingos to breed here have not been successful. Other waterbirds have increased considerably in numbers and diversity since the introduction of fish in 1961. At times Nakuru is a major feeding ground for Great White Pelicans, which nest on rocky islets in nearby Lake Elmenteita and move to Nakuru daily to feed. Large numbers of Palaearctic waders winter at Nakuru or use the site on passage, and Nakuru (at least in the past) has been a key site in the eastern Rift Valley flyway. Nakuru is rich in birds generally

Globally-threatened species

Madagascar Squacco Heron	Near-threatened	Non-breeding visitor, May to October (Zimmerman *et al.* 1996)
Lesser Flamingo	Near-threatened	A key feeding site for this species
Lesser Kestrel	Vulnerable	Passage migrant, relatively common in the past (e.g. OS-c 1983b)
*Grey-crested Helmet-shrike	Vulnerable	Probably resident in the *Acacia* wood land, where it has nested (Bennun 1994a, OS-c 1981)

**also restricted-range species*


49 Lake Nakuru National Park
Nakuru Town
Sewage Works
Sewage Works
Lanet
springs
Nyuki Special Camp
Nyati Special Camp
Kaka
School
Sarova Lion Hill Lodge
Baboon Cliffs
Lake Nakuru
springs
Lion Hill
Lake Nakuru Lodge
Lake Nakuru National Park
N
Naishi Park Sub-HQ
Kiriri
2100
1800
0
5
Kilometres
Lake
National Park
River
Contour
Road
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

Congregations

More than 20,000 waterbirds	1990–1997 mean: 286,000 (15 counts); max: 1,448,000 (July 1993)
1% or more of biogeographic population	
Greater Flamingo (1,250)	1990–1997 mean: 1,700 (15 counts); max: 9,940 (Jan 1991)
Lesser Flamingo (20,000)	1990–1997 mean: 280,200 (15 counts); max: 1,448,000 (1993)
Black-necked Grebe (250)	600 (Jan 1993)
Little Grebe (500)	Jul 1990–Jan 1993 mean: 4,090 (6 counts); max: 7,860 (Jan 1991)
Great White Pelican (1,800)	Jul 1990–Jul 1993 mean: 22,460 (7 counts); max: 44,430 (Jan 1992)
Yellow-billed Stork (500)	Jul 1990–Jan 1992 mean: 1,010 (4 counts); max: 1,620 (Jul 1991)
African Spoonbill (150)	Jul 1990–Jul 1993 mean: 230 (7 counts); max: 580 (Jan 1992)
Black-winged Stilt (1,000)	3,120 (Jan 1991), 2,140 (Jan 1992)
Grey-headed Gull (1,000)	Jul 1990–Jul 1993 mean: 3,720 (7 counts); max: 9,040 (Jan 1991)
Gull-billed Tern (270)	1,390 (Jan 1992)

Data from the annual January and July waterbird counts (Bennun 1992a, 1992b, 1993; Nasirwa & Bennun 1994 & 1995, unpubl. data)

– some 450 species have been recorded – and the globally threatened Grey-crested Helmet-shrike is resident in the *Acacia* woodland.

Other wildlife

The park is a sanctuary for the Black Rhinoceros *Diceros bicornis* and the Square-lipped (White) Rhinoceros *Ceratotherium simum*, the latter introduced from South Africa. Rothschild's Giraffe *Giraffa camelopardalis rothschildi* was also introduced into the park in 1977. The rare Large-eared Leaf-nosed Bat *Hipposideros megalotis* is resident. Other large mammals, some recently re-introduced, include Bohor Reedbuck *Redunca redunca*, Defassa Waterbuck *Kobus ellipsiprymnus*, Bushbuck *Tragelaphus scriptus*, Lion *Panthera leo*, Leopard *Panthera pardus*, Spotted Hyaena *Crocuta crocuta* and small numbers of Cheetah *Acinonyx jubatus*.

Conservation issues

Conflicts between conservation and development remain unresolved at Nakuru. On the one hand, the National Park is a major tourist attraction, with up to 300,000 foreign and local visitors per year, and the lake was designated as Kenya's first Ramsar site in 1990. On the other hand, Nakuru town is an important industrial and agricultural centre, whose growth directly affects the lake. Until recently, treatment of waste water entering the lake from the town was inadequate. An expanded sewage treatment works is now in commission, but concerns about industrial pollution persist. The Lake Nakuru Conservation and Development Project, run by the World Wide Fund for Nature, has been working for some years to improve urban environmental standards and encourage sustainable land-use in the catchment. Nearly half the catchment is now under cultivation, and river flows have reduced markedly while silt loads have risen. This problem will be severely exacerbated by recent deforestation in the Eastern Mau Forest Reserve (part of IBA 51), which provides the catchment for much of Nakuru's water. Encroachment and settlement in this forest (reportedly by as many as 28,000 people) needs to be reversed and natural vegetation allowed to regenerate, or the lake may have little future.

The lake's ecology, though relatively simple, is fragile. Populations of *Spirulina*, and the invertebrates, fish and flamingos that feed on it, can only be supported under specific, narrow conditions. Severe declines in waterbird numbers (other than flamingos) since 1993 point to major changes in the food chain – specifically, a lack of fish and invertebrates – associated with a period of low lake levels. Lake Nakuru's levels fluctuate naturally due to little-understood interactions between hydrology, meteorology and geology. It is unknown how human pressures may have influenced the natural cycle, or

Regionally-threatened species

Great Crested Grebe	Critical	Used to occur in numbers (29 recorded in July 1990); no recent records
Maccoa Duck	Endangered	No recent records
Great Egret	Vulnerable	Up to 84 recorded (January 1992); numbers have declined in recent years
Martial Eagle	Vulnerable	Sparse resident
African Skimmer	Vulnerable	No recent records
Long-tailed Widowbird	Vulnerable	Seasonal visitor, in long grassland

From the annual waterbird counts (see above), Zimmerman et al. *(1996) and unpubl. data*

if the lake's bird populations will rebound if and when water levels rise.

The National Park is now entirely surrounded by a 74-km electric fence that prevents movements of animals in or out. Large mammal populations in the Park are expanding, and careful management will be needed to avoid serious ecological imbalances – for instance, giraffe are currently destroying the *Acacia* woodland through de-barking. The requirements of threatened birds such as the Grey-crested Helmet-shrike should also be considered in management planning, which presently is focused entirely on large mammals.

Further reading

Mburugu 1974, Myers 1974, Vareschi 1978, Vareschi & Jacobs 1985, Richards 1991, Hughes & Hughes 1992, Howard & Bennun 1993, Mutangah 1994

Lesser Flamingo

50 Masai Mara

01°30'S, 35°00'E, Rift Valley Province, Narok and Transmara Districts
664,000 ha (181,200 ha National Reserve
and 482,800 ha wildlife dispersal area)
Altitude: 1,500–2,170 m
Status: National Reserve and Group Ranches
Categories: Globally-threatened species, restricted-range species

Site description

This IBA includes the Masai Mara National Reserve and the surrounding wildlife dispersal areas in south-western Kenya. (Collectively, the Reserve and its surrounds are often called the Greater Mara; here, Masai Mara refers to the entire IBA.) The site adjoins the Serengeti National Park along the Kenya–Tanzania border, and is considered part of the same ecosystem. The National Reserve is Kenya's most-visited protected area, world famous for its high density of herbivores and predators, and the annual migrations of Wildebeest *Connochaetes taurinus*. In 1996, it was nominated for designation as a World Heritage Site. To the north, east and west are large parcels of land demarcated as group ranches, owned and inhabited by the semi-nomadic pastoral Maasai people. This communal land forms an extensive wildlife dispersal area for the Reserve, comprising the group ranches of Siana (152,000 ha), Koiyaki (94,000 ha), Olkinyei (80,000 ha), Lemek (66,000 ha), Kimindet (37,000 ha), Olorien (26,000 ha), Olchorro Ouirwa (11,800 ha), Kerinkani (8,100 ha) and Angata Baragoi (7,900 ha).

Corncrake

Habitats in the Masai Mara are varied, including open rolling grassland, riverine forest, *Acacia* woodland, swamps, non-deciduous thickets, boulder-strewn escarpments, and *Acacia*, *Croton* and *Tarchonanthus* scrub. The permanent Mara and Talek Rivers, and their tributaries, flow through the Reserve and approximately trisect it. There is a pronounced rainfall gradient from the drier east (with c. 800 mm rain per year) to the wetter west (with c. 1,200 mm per year).

Birds

See box for key species. The Mara's extensive grasslands are a stronghold for the threatened, migratory Corncrake and the near-threatened, restricted-range Jackson's Widowbird. The woodlands around the reserve are probably the centre of abundance for the threatened, restricted-range Grey-crested Helmet-shrike. More than 500 other bird species are known to occur, including 12 species of *Cisticola* and 53 birds of prey. Grassland birds are especially well represented. Large numbers of Palaearctic migrants winter in the area, including Caspian Plovers and White Storks. The Oloolulo or Siria Escarpment is one of the few Kenyan sites for Rock Cisticola, and other local and unusual birds in the Masai Mara include Rufous-bellied Heron, Denham's Bustard, Black Coucal, Red-tailed Chat, Pale Wren Warbler, Tabora Cisticola, Icterine Warbler (in the northern winter), Yellow-bellied Hyliota, Green-capped Eremomela and Magpie Shrike. There is a single record of Shoebill, from the Musiara Swamp (Kahindi 1994).

Other wildlife

The Masai Mara is remarkable for its great concentration of large herbivores and their attendant predators. The density of herbivores is estimated as nearly 240 per km^2, with a biomass of just

under 30 tonnes per km^2 (Gakahu 1992). The extraordinary annual migration of some eight million Wildebeest *Connochaetes taurinus* (and 200,000 Plains Zebra *Equus burchelli*) is world famous. There are particularly large numbers of Lion *Panthera leo* and Spotted Hyaena *Crocuta crocuta*, and populations of the threatened Black Rhinoceros *Diceros bicornis* and African Elephant *Loxodonta africana*. The Hunting Dog *Lycaon pictus* now appears to be extinct in the Reserve, having succumbed to epidemics of rabies and canine distemper virus (possibly caused by exposure to domestic dogs). A population still survives in the scrublands of Naikarra and Laleta Hills on Siana Group Ranch (Martyn 1995).

Conservation issues

The Masai Mara Game Reserve is owned and managed by the Narok County Council and Transmara County Council, which collect gate and other fees. Lodges and camps outside the Reserve remit occupation, concession and viewing fees directly to wildlife and tourism associations composed of the local communities.

Wildlife generates very substantial revenue in the Masai Mara. An estimated KSh 444 million was earned in 1987, when 122,000 people visited the area (Douglas-Hamilton 1988). Visitor numbers rose to almost 159,000 by 1994 (Wasilwa 1997), with revenue presumably increasing in proportion. At $27 dollars per person, daily 'viewing fees', are currently the highest in Kenya. However, only a small amount of the overall earnings are retained locally (around 10% in 1987: Douglas-Hamilton, 1988). Of this, an even smaller amount appears to trickle down to the local communities (Wasilwa 1997). Most Maasai still feel that they benefit little from the wildlife on their land.

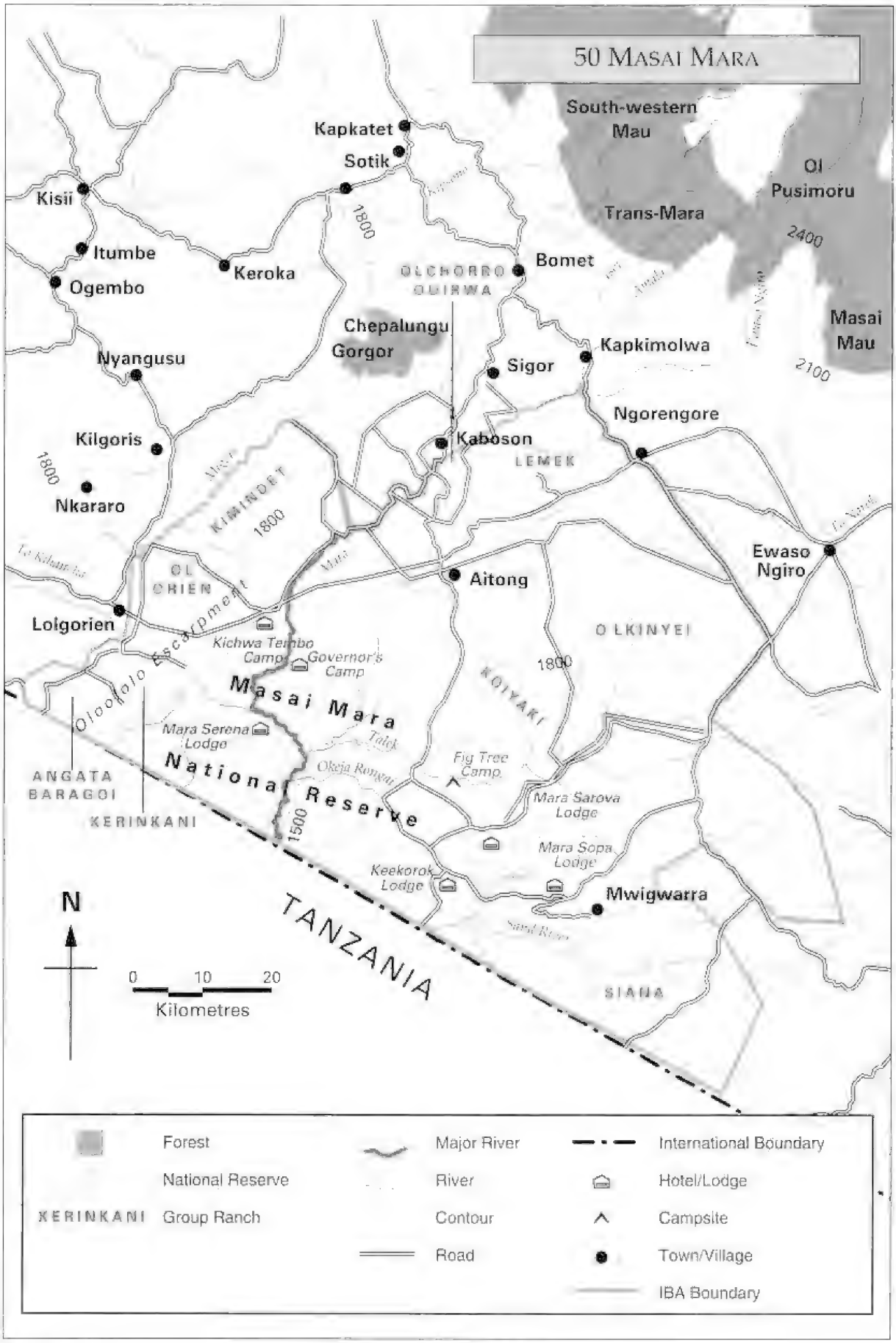
Globally-threatened species

Madagascar Squacco Heron	Near-threatened	Regular non-breeding visitor (Finch 1994)
Lesser Kestrel	Vulnerable	Regular passage migrant (Zimmerman *et al.* 1996)
Corncrake	Vulnerable	A regular non-breeding visitor to grassland areas. This is an important wintering population (D.A. Turner, *in litt.*, Collar *et al.* 1994)
*Grey-crested Helmet-shrike	Vulnerable	Regularly recorded but apparently nomadic, in woodland and bushland in the eastern dispersal area and western escarpment (OS-c 1981, Bennun 1994c, Finch 1994)
*Red-throated Tit	Near-threatened	Common resident in *Acacia* woodland
*Jackson's Widowbird	Near-threatened	Probably the largest breeding population of this species

**also restricted-range species*

Other restricted-range species

[Usambiro Barbet *Trachyphonus usambiro*]	Common in bushed and wooded grassland with termite mounds. This is treated as a full species by Stattersfield *et al.* (1998), but considered a sub-species of D'Arnaud's Barbet *T. darnaudii* by the East Africa Natural History Society Ornithological Sub-committee (OS-c 1996)


50 MASAI MARA
South-western Mau
Kapkatet
Sotik
Kisii
Itumbe
Ogembo
Keroka
Trans-Mara
Ol Pusimoru
Bomet
OLCHORRO OUIRWA
Chepalungu
Gorgor
Nyangusu
Sigor
Kapkimolwa
Masai Mau
Kilgoris
Kaboson
Ngorengore
LEMEK
Nkararo
KIMINDET
Aitong
Ewaso Ngiro
OL ORIEN
Loigorien
Kichwa Tembo Camp
Governor's Camp
Masai Mara National Reserve
Mara Serena Lodge
Olooloolo Escarpment
ANGATA BARAGOI
KERINKANI
OLKINYEI
KOIYAKI
Fig Tree Camp
Mara Sarova Lodge
Mara Sopa Lodge
Keekorok Lodge
Mwigwarra
TANZANIA
SIANA
N
0 10 20
Kilometres
Forest
National Reserve
KERINKANI Group Ranch
Major River
River
Contour
Road
International Boundary
Hotel/Lodge
Campsite
Town/Village
IBA Boundary

Regionally-threatened species

African Darter	Vulnerable	Occasional visitor
Great Egret	Vulnerable	Present year-round in the swamps
Saddle-billed Stork	Vulnerable	Several pairs nest in the swamps
White-headed Vulture	Vulnerable	Commoner than in many areas, regularly nests
Banded Snake Eagle	Vulnerable	In small numbers in riverine forest
Ayres's Hawk Eagle	Vulnerable	Occasional visitor
Martial Eagle	Vulnerable	Resident
African Crowned Eagle	Vulnerable	Confined to Oloololo Escarpment area
Blue Quail	Vulnerable	Rare intra-African migrant
Baillon's Crake	Vulnerable	Occasional visitor
African Finfoot	Vulnerable	Resident on thickly-fringed rivers
Denham's Bustard	Endangered	Up to 10 seen on Musiara Plains in 1996 (O. Kahindi, *in litt.*), but the population may now be as low as 2–3 individuals (D.A. Turner, *in litt.*)
Pel's Fishing Owl	Vulnerable	Resident along the Mara River
Yellow-billed Oxpecker	Vulnerable	Common resident within the Reserve

Except where stated, data from Finch (n.d., 1994), Zimmerman et al. *(1996), LAB, unpubl. data*

As a result, and because of a rapidly growing human population, land-use changes are accelerating. With moderately high rainfall and fertile soils, parts of the area have good agricultural potential. Large-scale farms with fields of wheat, maize, barley, soya beans and sorghum already cloak the landscape towards the north, in Lemek and Olkinyei, and there are now farms within 17 km of the reserve boundary (Wasilwa 1997). Over the IBA as a whole, agriculture covered 12% of the land area in 1996, compared to just 3% in 1975, while open grassland (the preferred habitat for conversion to cropland) had declined from 24% to 13% (Wasilwa 1997). Most farmers are non-Maasai who either lease the land (for large-scale farming) or have bought small plots. A number of local people are also turning to farming, and fenced-off agricultural plots are mushrooming in areas of rangeland and along the Mara River.

As well as the clearance of natural vegetation that obviously accompanies agriculture, this trend increases the pressure for demarcation and sub-division of land. This involves the splitting up of group ranches (where the land is unfenced and held collectively by members of the group) into individual plots that can be fenced, leased or sold. Generally, sub-division is a process inimical to wildlife conservation. In areas where the rainfall is erratic and unpredictable, the resulting fixed, small land-holdings are widely regarded as ecologically inappropriate, unable reliably to support either

farming or ranching. As sub-division proceeds, the movement of wildlife is inevitably impeded, and human-wildlife conflict increases.

Some 25 tented camps and lodges now operate in and around the Reserve. There has been little consideration of how many tourist facilities the area can support, and the proliferation of accommodation puts severe pressure on resources, particularly wood-fuel (Kahindi & McIlvaine 1993, O. Kahindi, *in litt.*). At the same time, there is widespread concern that investment in conservation and in basic facilities, such as roads, has been minimal, and the standard of protected area management generally appears wanting. Uncontrolled dry-season grass fires, poaching for meat (both for subsistence and on a commercial scale, especially along the western boundary: M. Coverdale, *in litt.*), invasion of the Reserve by livestock, rampant off-track driving, and chronic harassment of animals have all attracted unwelcome attention. Epidemics of canine distemper virus have killed many Lions and eliminated the Reserve's Hunting Dog population. Riverine forests are being destroyed in many places by the increasing number of elephants, which have moved into the Reserve from insecure lands around it (including the Serengeti National Park in Tanzania).

Clearly, an integrated land-use plan is urgently needed to address the serious social, economic and conservation problems that are emerging in the Masai Mara. This should not ignore the area's birdlife. The Serengeti-Mara ecosystem is already the focus of considerable long-term biological research (notably on predator–prey relationships and the ecology of grazers, Hunting Dog, Spotted Hyena and Lion), but very little scientific attention has been paid to its birds. As grassland habitats vanish elsewhere in Kenya, the Masai Mara becomes ever more significant for bird conservation, and its birds require proper study.

Further reading

Jones 1982, Douglas-Hamilton 1988, Gakahu 1991, Scott 1992, Finch 1994, Braunstein 1996, Opala 1996, Fuya 1996, Wasilwa 1997, Wilson not dated

51 Mau Forest Complex

0°30'S, 35°20'E, Rift Valley Province, Nakuru, Kericho, Narok and Bomet Districts

270,300 ha (224,300 ha gazetted, 46,000 ha ungazetted)

Altitude: 1,800–3,000 m

Status: Forest Reserves and ungazetted forest

Category: Afrotropical Highlands biome species

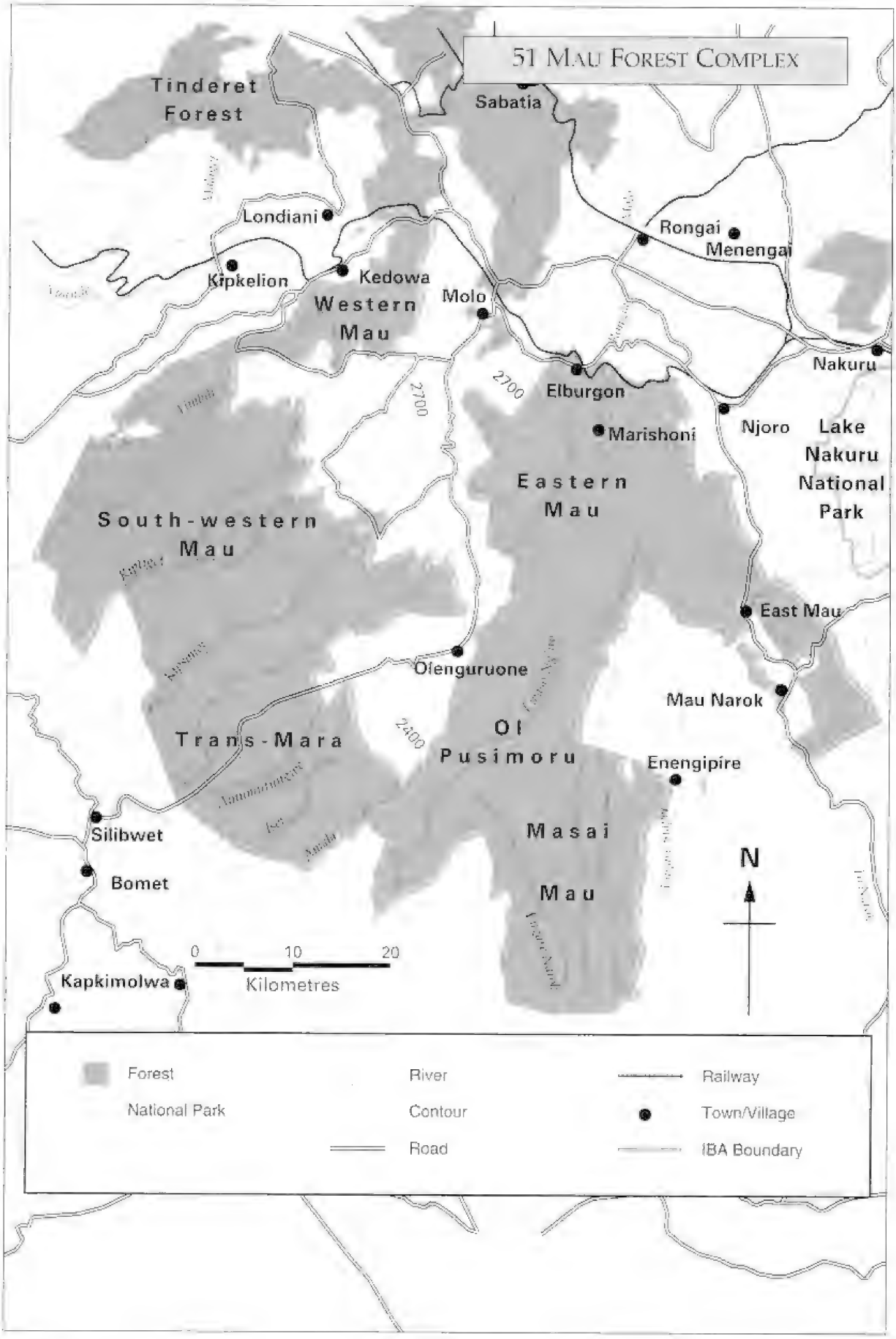
Site description

This forest complex covers a substantial area of the south-western highlands of Kenya, and probably represents the largest remaining near-continuous block of montane indigenous forest in East Africa. The forests cloak the western slopes, and part of the crest, of the Mau Escarpment, a block of raised land that forms the western wall of the Gregory Rift Valley, rising steeply from the floor and sloping away more gradually to the west. There are five main Forest Reserves: Eastern, Western and South-western Mau (c. 66,000, 22,700 and 84,000 ha respectively), Trans-Mara (34,400 ha) and Ol Pusimoru (17,200 ha). A sixth large block, the Maasai Mau (c. 46,000 ha) is as yet ungazetted. The forest lies across four administrative districts: Narok, Nakuru, Bomet and Kericho.

The Mau has deep, fertile, volcanic soils, and rainfall in places is among the highest in Kenya. Annual precipitation ranges from around 1,000 mm in the east, with a seasonal regime, to 2,000 mm in the west, where it is more-or-less continuous around the year. Numerous streams drain the forests west of the scarp crest, forming part of the Sondu and Mara river systems, which flow into Lake Victoria, and the Southern Ewaso Ng'iro system, which flows into Lake Natron. The Eastern Mau is the main watershed for Lake Nakuru, through the Njoro, Makalia and Enderit Rivers. The surrounding areas are intensively farmed, with human population densities about twice as high on the western side of the forest as on the east.

Vegetation patterns are complex, but there is a broad altitudinal zonation from west to east, lower montane forest below 2,300 m giving way to thickets of bamboo *Arundinaria alpina* mixed with forest and grassland, and finally to montane sclerophyllous forest near the escarpment crest. The lower montane forest is in best condition in the South-western Mau Nature Reserve, where characteristic trees include *Aningeria adolfi-friedericii* and *Strombosia scheffleri*. Elsewhere, this zone has been heavily and destructively logged, most recently for plywood from *Polyscias kikuyuensis*. Logged-over areas are dominated by pioneer species such as *Tabernaemontana stapfiana*, *Syzygium guineense* and *Neoboutonia macrocalyx*, while pockets of less-disturbed forest hold *Olea capensis*, *Prunus africana*, *Albizia gummifera* and *Podocarpus latifolius* (Mutangah *et al.* 1992). Substantial parts of the high *Juniperus–Podocarpus–Olea* forest have been encroached and cleared, although some sections remain in good condition. Large areas of both the Eastern and Western Mau have been converted to plantation forest.

Eastern Double-collared Sunbird


51 Mau Forest Complex
Tinderet Forest
Sabatia
Londiani
Rongai
Menengai
Kipkelion
Kedowa
Western Mau
Molo
Nakuru
2700
Elburgon
Marishoni
Njoro
Lake Nakuru National Park
Eastern Mau
South-western Mau
East Mau
Olenguruone
Mau Narok
Trans-Mara
2400
Ol Pusimoru
Enengipire
Masai Mau
Silibwet
Bomet
N
0 10 20
Kilometres
Kapkimolwa
Forest
National Park
River
Contour
Road
Railway
Town/Village
IBA Boundary

Regionally-threatened species

Ayres's Hawk Eagle	Vulnerable	Scarce and local
African Crowned Eagle	Vulnerable	Resident in small numbers
African Grass Owl	Vulnerable	No recent records; may occur in high grasslands of the South-western Mau
Cape Eagle Owl	Vulnerable	Mainly in high, rocky ravines in the Eastern Mau
Red-chested Owlet	Vulnerable	Fairly common in closed-canopy forest in South-west Mau and Trans-Mara
Least Honeyguide	Vulnerable	In closed-canopy forest in South-western Mau and Trans-Mara
Grey-winged Robin	Vulnerable	Uncommon and local, only on the western fringe
Purple-throated Cuckoo-shrike	Vulnerable	Uncommon resident

Data from Belts (1966), Sessions (1966), Lewis & Pomeroy (1989), Bennun (1991), Bennun & Waiyaki (1992a,b), Zimmerman et al. *(1996)*

Birds

The avifauna of the forests (except for the Maasai Mau) is now fairly well studied. Forty-nine of Kenya's 67 Afrotropical Highland biome species are known to occur here (Appendix 3), and the Mau generally has a rich highland bird community, characteristic of the Central Kenya highlands but with some western affinities. A number of species of regional conservation concern occur (see box), as well as regional endemics such as Hartlaub's Turaco and the restricted-range Hunter's Cisticola and Jackson's Francolin. This forest holds one of the richest examples of a central East African montane avifauna, and its size means that populations of most species are likely to be viable.

Other wildlife

Notable mammals include the rare Yellow-backed Duiker *Cephalophus silvicultor*, the little-known African Golden Cat *Felis aurata* and the very sparsely distributed Mountain Fruit Bat *Stenonycteris lanosus*. There appears to be a sizeable population of African Elephant *Loxodonta africana* and what was once probably the largest Kenyan population of Bongo *Tragelaphus eurycerus*, now scarce (Davies 1993b). Giant Forest Hog *Hylochoerus meinertzhageni* is also recorded. Three primate species, Black-and-white Colobus *Colobus guereza*, Blue Monkey *Cercopithecus mitis* and Red-tailed Monkey *C. ascanius* are abundant, and Potto *Perodicticus potto* also occurs (ERL 1990, Davies *et al.* 1993). The butterfly *Capys cuprens* is endemic to the Mau Escarpment. There is little information on other fauna.

With their relatively high rainfall, the Mau Forests, and the South-west Mau in particular, are important for orchids. Three rare and unusual species occur in the South-west Mau (B. Bytebier, *in litt.*). *Polystachia bella*, one of the few Kenyan endemic orchids, grows on the mossy branches of tall forest trees between 1,800 and 2,000 m in the Kericho area. Another endemic, *Bulbophyllum bidenticulatum*, is known from only two specimens collected along the Kiptiget River. *Chaseella pseudohydra* is a near-endemic recorded only from the South-west Mau and from Honde Gorge in Zimbabwe. The Mau is also one of the centres of abundance for the tree *Polyscias kikuyuensis*, endemic to central Kenya.

Conservation issues

The most valuable parts of the Mau for bird conservation are the relatively intact forests of the lower parts of the South-West Mau, and the high montane forests on the eastern rim. These areas

cover only a small proportion of the forest. The more open, destructively-logged forest holds good populations of many highland species, but densities of forest-specialist birds are relatively low. The bamboo-forest-grassland mosaic has an impoverished avifauna, though it may be important for some species such as Mountain Buzzard (Bennun & Waiyaki 1992a,b).

The main conservation problem in the Mau is that facing many Kenyan forests: increasing pressure on productive land from an expanding population. A particular complication in this case is the presence of the forest-dwelling Okiek people, several thousand of whom have been evicted from the forest since the mid-1980s and are awaiting resettlement. (The Okiek may have used the forest's resources sustainably in the past, but their hunter-gatherer lifestyle was in direct conflict with forestry policy.) Immigration of other ethnic groups to the eastern edge of the forest (particularly from the densely populated western borders) has added to the number of people expecting to be resettled, and increased the pressure on forest resources. Current use of the forest by local people includes (illegal) hunting (Bongo are often pursued using dogs, and this has had a severe impact on their population: Davies 1993b), honey-gathering (forest trees are cut and de-barked to construct hives), fuelwood collection and grazing. These activities, which might be carried out sustainably, are largely unregulated at present, causing further degradation and preventing degraded areas from recovering. It is estimated that 28% of forest cover in the eastern sector was lost between 1967 and 1989, and clearly this process is continuing. The western boundary (flanked by well-established small-holdings or large tea estates) has been more stable. Unfortunately, a number of recent excisions have, for unclear reasons, targeted areas in the west, which contain the most valuable and intact tracts of closed-canopy forest. In the Eastern Mau, forest plots have recently been allocated to a reported 28,000 settlers, apparently without formal excision of the forest reserve. This may have destroyed much of the watershed for Lake Nakuru (IBA 49).

The main Olenguruone-Sifibwet road passes through the centre of the Trans-Mara forest. This road has recently been upgraded, despite concerns about the indirect impact this might have on forest conservation (cf. ERL 1990). With reasonable roads, the Mau could potentially be included on a tourist circuit that included Lake Nakuru and the Masai Mara Game Reserve (IBAs 49 and 50). However, the lack of spectacular scenery, poor condition of much of the logged forest, and high rainfall would make eco-tourist development a challenge.

Further reading

Bally 1946, Toschi 1946, Kerfoot 1964, Sessions 1966, Wilson 1988, ERL 1990, Bennun 1991, Bennun & Waiyaki 1992a,b, Reuling *et al.* 1992, Mutangah *et al.* 1993, Blackett 1994a, Jackson & McCarter 1994

52 Mau Narok–Molo Grasslands

0°33′S, 36°55′E, Rift Valley Province, Nakuru District

c. 40,000 ha

Altitude: 2,700–3,100 m

Status: Unprotected, mainly private land

Categories: Globally-threatened species, restricted-range species

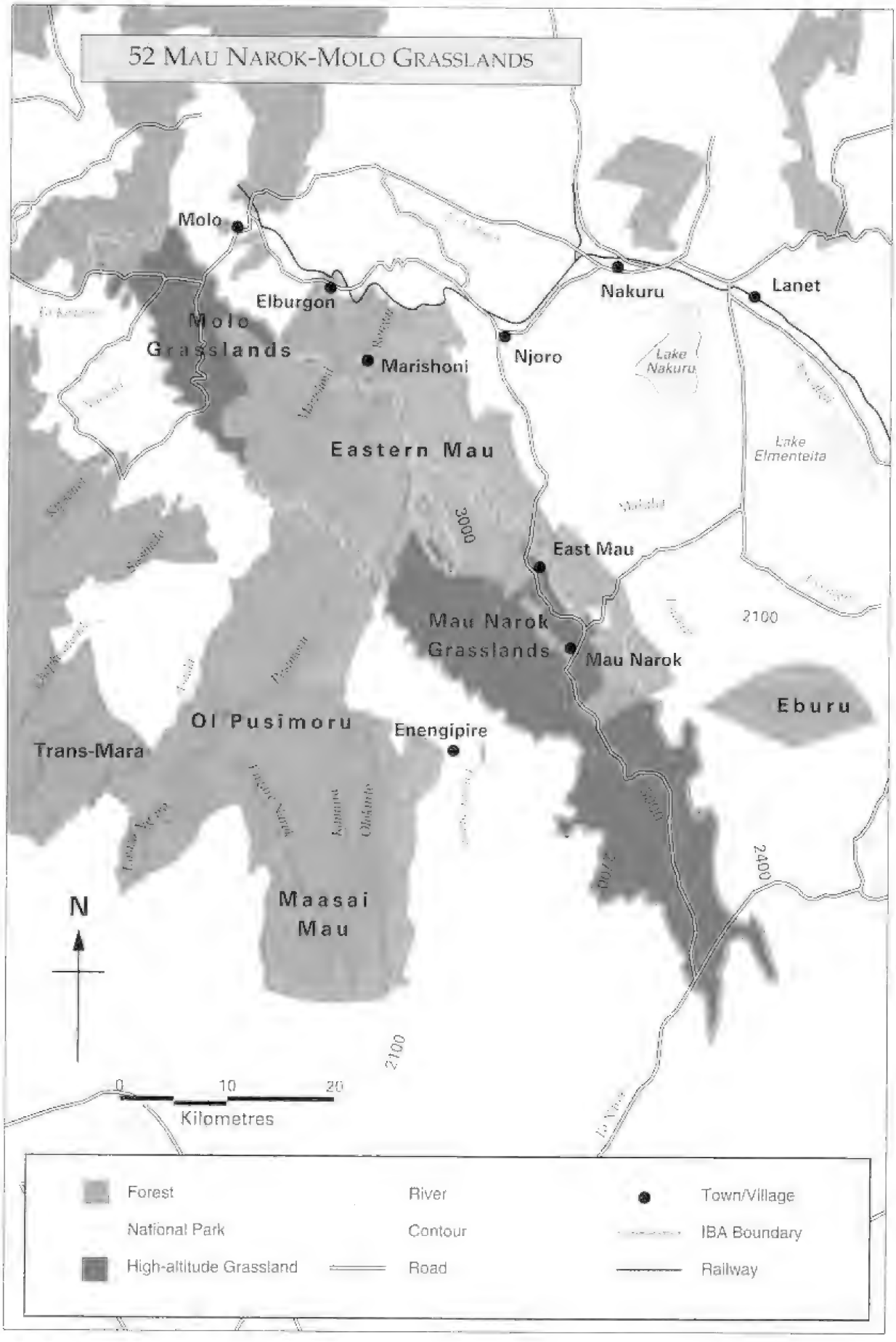
Site description

An extensive area of montane grassland along the crest of the Mau Escarpment, which forms the western wall of the central Rift Valley in Kenya. This high, open plateau runs for around 80 km south-east to north-west, and is bounded on each side (and partially interrupted) by the forests of the Mau Forest complex (IBA 51). Rainfall is around 1,000 mm per year, and the original vegetation is short grassland, with some heather and scrub on the ridges where the soil is deeper. The area has high potential for agriculture, and has gradually been settled and cultivated since the 1950s: it is now heavily populated, with a landscape severely modified by cultivation. Cereals are the major crops, and much grassland has been converted by ploughing and re-seeding with exotic species to provide better grazing for sheep.

Birds

See box for key species. The provisionally threatened, restricted-range Sharpe's Longclaw and Aberdare Cisticola are both known to occur, but their status and distribution within the IBA are unknown. Sessions (1966) provided a bird list compiled in the 1960s, but there is little recent information on the birds of this area. The present-day avifauna is likely to be similar to that of the Kinangop Plateau (IBA 4) on the opposite side of the Rift Valley.

Hunter's Cisticola


52 MAU NAROK-MOLO GRASSLANDS
Molo
Elburgon
Molo Grasslands
Marishoni
Njoro
Nakuru
Lanet
Lake Nakuru
Lake Elmenteita
Eastern Mau
3000
East Mau
2100
Mau Narok Grasslands
Mau Narok
Eburu
Ol Pusimoru
Enengipire
Trans-Mara
Maasai Mau
2400
2100
N
0
10
20
Kilometres
Forest
National Park
High-altitude Grassland
River
Contour
Road
Town/Village
IBA Boundary
Railway

Globally-threatened species

Lesser Kestrel	Vulnerable	Palaearctic passage migrant, formerly regular (Sessions 1966)
Great Snipe	Near-threatened	Uncommon Palaearctic winter visitor (Sessions 1966, Zimmerman *et al.* 1996)
*Sharpe's Longclaw	Provisionally vulnerable (Bennun & Njoroge 1996)	Status unknown, formerly common (Sessions 1966)
*Aberdare Cisticola	Provisionally vulnerable (Bennun & Njoroge 1996)	Status unknown
*Jackson's Widowbird	Near-threatened	Status unknown

**also restricted-range species*

Regionally-threatened species

Great Crested Grebe	Critical	Status unknown; may still breed on upland dams (cf. Sessions 1966)
Denham's Bustard	Endangered	Probably extirpated (Zimmerman *et al.* 1996)

Other restricted-range species

Jackson's Francolin	Formerly common at forest margins
Hunter's Cisticola	Likely to be common in scrubby areas

Other wildlife

The fauna and flora of these grasslands has been little studied. A number of plant, insect, amphibian and reptile species that are confined to highland grassland probably occur. There are records of two near-endemic frogs, *Hyperolius montanus* and *Rana wittei* (Duff-MacKay 1980). *Hyperolius montanus* was considered secure in 1980, but it is a montane grassland species and may now be under threat. The Kenya Horned Viper *Bitis worthingtonii*, endemic to the central Kenyan Rift Valley above 1,500 m (Spawls 1978), probably occurs.

Conservation issues

Kenya's unique montane grasslands have no formal protection. This IBA faces similar threats to those on the Kinangop Plateau (IBA 4), with grassland habitat diminishing and fragmenting rapidly as agriculture spreads. A survey is urgently needed to assess its status and that of the threatened birds.

Further reading

Sessions 1966

53 North Nandi Forest

00°00'S, 35°00'E, Rift Valley Province, Nandi District

10,500 ha

Altitude: 1,700–2,130 m

Status: Forest Reserve

Categories: Globally-threatened species, restricted-range species, Guinea-Congo Forests biome species

Site description

This is a strip of high-canopy forest on the edge of the Nandi escarpment, above and immediately east of Kakamega Forest (IBA 58). North Nandi stretches for more than 30 km from north to south and is 3–5 km wide for most of its length. Drainage is mainly eastwards into the Kigwal and Kimondi River systems, which flow through the South Nandi forest (IBA 55) and westwards into the Yala River and Lake Victoria.

Biogeographically, North Nandi is transitional between the lowland forests of West and Central Africa (the easternmost outlier of which is Kakamega) and the montane forests of the central Kenya highlands. It is higher in altitude than Kakamega and the vegetation is floristically less diverse. Common trees include *Diospyros abyssinica*, *Croton macrostachyus*, *Syzgium guineense* and *Celtis africana*, with a dense undergrowth of *Acanthus* and *Brillantaisia*. Rainfall is about 1500 mm annually, and the well-drained, friable soils are moderately fertile.

North Nandi was first gazetted in 1936 as a Trust Forest covering 11,850 ha. In 1968 the North Nandi Nature Reserve was established, amounting to 3,434 ha. Since gazettement, a total of 1,343 ha have been excised, including part of the nature reserve. An additional 410 ha has been converted to Nyayo Tea Zone. Of the present gazetted forest area (10,500 ha), approximately 8,000 ha is indigenous, closed-canopy forest, the remainder consisting of cultivation, scrub, grassland, plantations and tea (Blackett 1994g). All areas outside the Nature Reserve were originally slated for conversion to plantation forest, but this has not taken place.

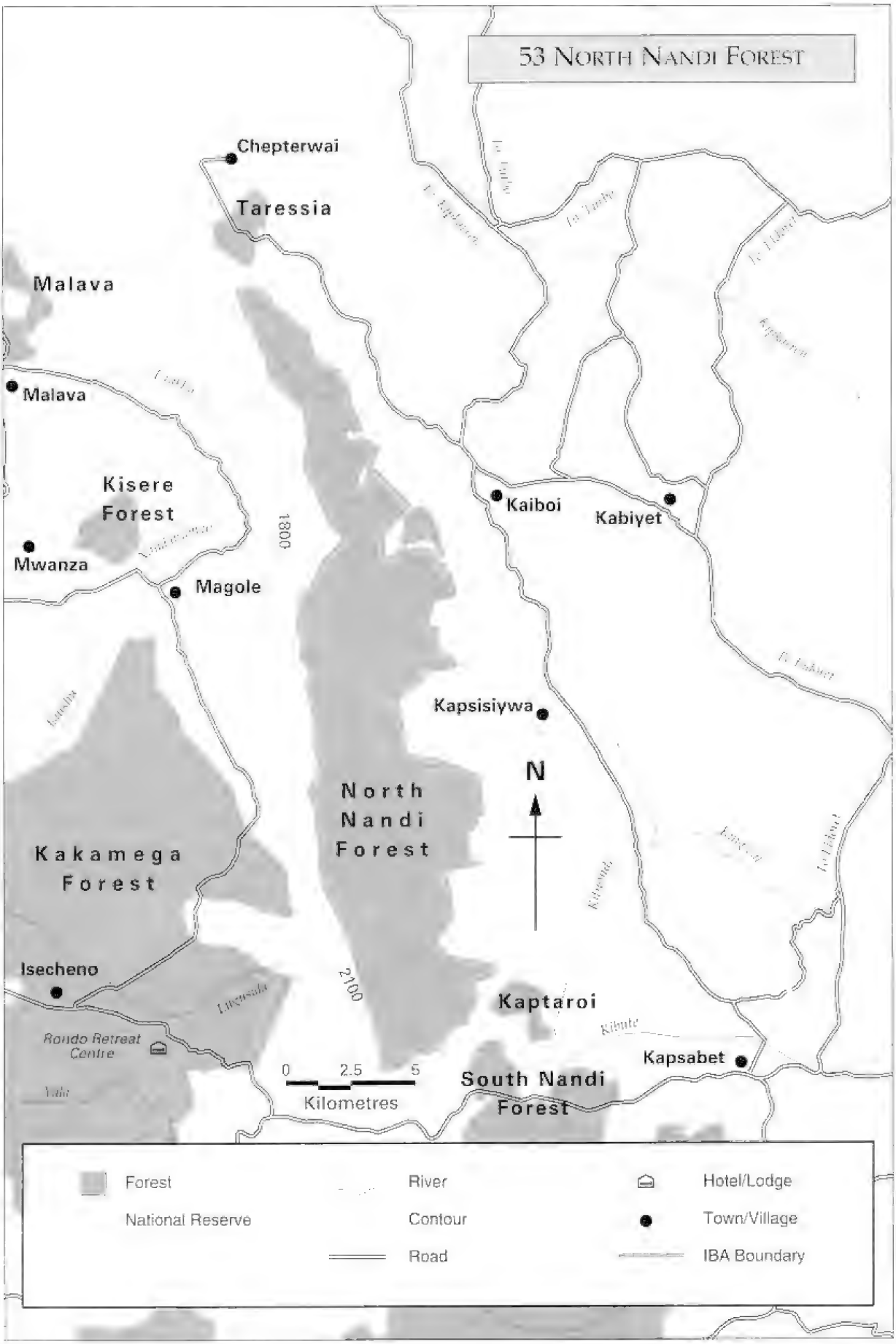
Birds

See box and Appendix 3 for key species. The forest belongs to the Kakamega and Nandi Forests Secondary Area of endemism, defined by the presence of the globally-threatened, restricted-range Chapin's Flycatcher (Stattersfield *et al.* 1998). The avifauna is similar to that of Kakamega Forest, being a mixture of species characteristic of two biomes: the Guinea-Congo Forests (24 out of 43 Kenyan species) and Afrotropical Highlands biomes (34 out of 67 species including Chapin's Flycatcher); around 160 species in all are recorded (H. Schifter, *in litt.*, Zimmerman *et al.* 1996). North Nandi is less rich in species than Kakamega and its bird communities have a larger montane element. There have been no recent surveys here and the present status of North Nandi's rare birds, including Chapin's Flycatcher, is unknown.

Other wildlife

Potto *Perodicticus potto*, Lord Derby's Anomalure *Anomalurus derbianus* and African Palm Civet *Nandinia binotata*, all rare in Kenya, are recorded, as is the rare West African chameleon genus *Brookesia*.

Chapin's Flycatcher


53 North Nandi Forest
Chepterwai
Taressia
Malava
Malava
Kisere Forest
Mwanza
Magole
1800
Kaiboi
Kabiyet
Kapsisiywa
N
North Nandi Forest
Kakamega Forest
Isecheno
2100
Kaptaroi
Rondo Retreat Centre
Kapsabet
South Nandi Forest
0 2.5 5
Kilometres
Forest
National Reserve
River
Contour
Road
Hotel/Lodge
Town/Village
IBA Boundary

Globally-threatened species		
*Chapin's Flycatcher	Vulnerable	Scarce resident (Zimmerman *et al.* 1996)

*also restricted-range species

Regionally-threatened species		
African Green Ibis	Vulnerable	May be locally extinct
African Crowned Eagle	Vulnerable	Resident in small numbers
Red-chested Owlet	Vulnerable	Uncommon
Thick-billed Honeyguide	Vulnerable	Local and uncommon, being replaced by Lesser Honeyguide as forest diminishes
Least Honeyguide	Vulnerable	Local and uncommon
Grey-chested Illadopsis	Vulnerable	Scarce
Southern Hyliota	Endangered	Uncommon, in the canopy of tall forest
Yellow-bellied Wattle-eye	Vulnerable	Uncommon, in densely-shaded forest

Status information from Zimmerman et al. *(1996)*

Conservation issues

North Nandi is an unusual and important forest. It contains many bird species that have very limited ranges in Kenya: a number occur only here and in Kakamega. Conversion of the forest to plantations, as originally envisaged, has fortunately not taken place. However, the forest remains a relatively narrow strip, under severe pressure from illegal timber extraction, charcoal burning, forest grazing of livestock and unsustainable removal of forest products (firewood, honey and medicinal plants) (Blackett 1994g). There appears to have been no special protection of the Nature Reserve. Much encroachment and clearance has taken place on the western edge of the forest, especially since 1982. Because the forest boundaries are unclear this has been difficult for Forest Department staff to control. The forest's shape, with a high perimeter-to-area ratio, means that edge effects are likely to be substantial.

The Forest Department is inadequately equipped to protect and manage the Reserve, and its capacity urgently needs to be increased. Biological surveys were carried out here in the 1970s (Cunningham-van Someren 1979, 1980, Schifter & Cunningham-van Someren, in prep.) but there is little up-to-date information on the avifauna. The status and habitat requirements of Chapin's Flycatcher in particular need to be assessed.

Further reading

Cunningham-van Someren 1979, 1980, Mann 1980, Blackett 1994g

54 Ol Donyo Sabache

0°50'N, 37°32'E, Rift Valley Province, Samburu District *(see map in site account 33)*

1,000 ha

Altitude: 1,880 m

Status: Unprotected

Category: Globally-threatened species

Site description

An isolated basalt mountain with dramatic cliff faces that tower above the surrounding plain, Ol Donyo Sabache is some 30 km north-west of Archer's Post along the main Isiolo-Marsabit road. It is often called Ololokwe, a name that refers to the general area rather than the mountain itself. Three-quarters of its circumference (around 14 km) is a sheer precipice up to 500 m high. The summit is a plateau of about 900 ha, divided in two by a small wooded valley that contains several springs. Around half the summit area is covered by dry *Juniperus-Podocarpus* forest, with numerous cycads *Encephalartos tegulaneus*. The steep cliffs are sparsely vegetated. The semi-arid plains below (at 1,100 m) are covered by bushland, but with many drainage lines that support some taller trees.

Birds

See box for key species. Ol Donyo Sabache is one of the most important sites in Kenya for birds of prey. The threatened Taita Falcon nests here, and 61 other diurnal raptors and nine species of owl have been recorded on the mountain and its foothills (Thomsett 1998). The mountain is a stop-over and 'refuelling' point for numerous Palaearctic migrants, including unusual species such as Levant Sparrowhawk, Eurasian Sparrowhawk, Saker Falcon and Eurasian Peregrine Falcon (race *calidus*), as well as Amur Falcon, Common (Steppe) Buzzard and Eurasian Honey Buzzard. Raptors nesting on the mountain (in forest or on the cliffs) or in the drainage lines below it include Verreaux's Eagle, African and Ayres's Hawk-Eagles, Martial and Tawny Eagles, African Harrier Hawk, Bateleur, Peregrine and (probably) Barbary Falcons, and Cape Eagle Owl. African Crowned Eagle nested here until the drought year of 1984. Up to 120 Rüppell's Griffon Vultures roost and nest in a colony on the cliffs. The avifauna at the base of the mountain is similar to that in Samburu National Reserve (IBA 33), while that on the summit contains an impoverished set of species characteristic of the central Kenyan highlands, including the restricted-range Hunter's Cisticola (Zimmerman *et al.* 1996).

Other wildlife

Black Rhinoceros *Diceros bicornis* formerly occurred here, but the animals were translocated to sanctuaries in 1982. African Buffalo *Syncerus caffer* are locally extinct since the drying up of mountain-top springs in 1984. Suni *Neotragus moschatus*, Bushbuck *Tragelaphus scriptus*, Lesser Kudu *T. imberbis* and Greater Kudu *T. strepsiceros* still occur on the summit, as do Leopard *Panthera pardus*. African Elephant *Loxodonta africana* move on to the mountain from the plains during the wet season, and six Hunting Dog *Lycaon pictus* were sighted here in

Globally-threatened species

Taita Falcon	Vulnerable	At least one nesting pair

Regionally-threatened species

Lammergeier	Vulnerable	Rare visitor
Ayres's Hawk Eagle	Vulnerable	Nests in the forest
Martial Eagle	Vulnerable	Nests near the base of the hill
African Crowned Eagle	Vulnerable	Not recorded since 1984

Data from Thomsett (1998)

1995 (S. Thomsett, *in litt.*). Ol Donyo Sabache shelters a near-endemic plant, *Streptocarpus exsertus*, and many fine specimens of the rare cycad *Encephalartos tegulaneus* (S. Thomsett, *in litt.*).

Conservation issues

The forest on Ol Donyo Sabache has been deteriorating since the drought year of 1984 (Thomsett 1998). Populations of livestock (mainly cattle and goats) had built up on the plains, thanks to the provision of new watering points. When drought struck, the only available grazing was on top of the mountain. The hill sides and summit were set on fire, in the belief that this would encourage rain, kill ticks and improve grazing. The effect was to destroy many forest trees and cause the springs to dry up, in turn causing the death of much wildlife and livestock as well. Subsequent fires, and continued grazing pressure, have severely damaged the forest and other vegetation on the summit. The cycads are fire-resistant, but many have been damaged by Samburu *morani* who cut the leaves away in order to collect and eat the cones.

Other threats are less serious. Visitors to the site, mainly climbers, leave a considerable amount of garbage on the climbing route and at camp sites. The main cliff face has at times been extensively mortared and shelled for military practice, thus disrupting nesting raptors.

With its magnificent views, extraordinary diversity of raptors and proximity to the Shaba, Samburu and Buffalo Springs National Reserves (IBAs 33 and 34) Sabache has potential for ecological tourism. A community-based programme might be developed to protect the mountain and its vegetation, while bringing in revenue to compensate for the potential loss of dry-season grazing.

Further reading

Allen 1975, Thomsett 1998

55 South Nandi Forest

00°05'S, 35°00'E, Rift Valley Province, Nandi District

18,000 ha (c. 13,000 ha forest)

Altitude: 1,700–2,000 m

Status: Forest Reserve

Categories: Globally-threatened species, Guinea-Congo Forest biome species

Site description

A mid-elevation forest lying just west of Kapsabet town and south of the main Kapsabet-Kaimosi road. South Nandi was once contiguous with Kakamega Forest (IBA 58) and the two forests are still no more than a few kilometres apart at their closest points.

Rainfall is high, 1,600 to 1,900 mm per year depending on altitude. The forest is drained by the Kimondi and Sirua rivers, which merge to form the Yala river flowing into Lake Victoria. The landscape is gently undulating and underlain by granitic and basement complex rocks, which weather to give deep, well-drained, moderately fertile soils. The South Nandi area has high agricultural potential and human densities around it are also high, particularly to the west.

Biogeographically, South Nandi is often considered an eastern extension of Kakamega. However, it is higher in altitude than Kakamega and floristically less diverse. In effect, South Nandi is transitional between the lowland forests of West and Central Africa (the easternmost outlier of which is Kakamega) and the montane forests of the central Kenya highlands. Common trees include *Tabernaemontana stapfiana, Macaranga kilimandscharica, Croton megalocarpus, C. macrostachyus, Drypetes gerrardii, Celtis africana, Prunus africana, Neoboutonia macrocalyx* and *Albizia gummifera* (Blackett 1994).

South Nandi was gazetted in 1936 as a Trust forest covering 20,200 ha, since when approximately 2,200 ha have been excised for settlement, around 340 ha planted with tea, and 1,400 ha planted with exotic

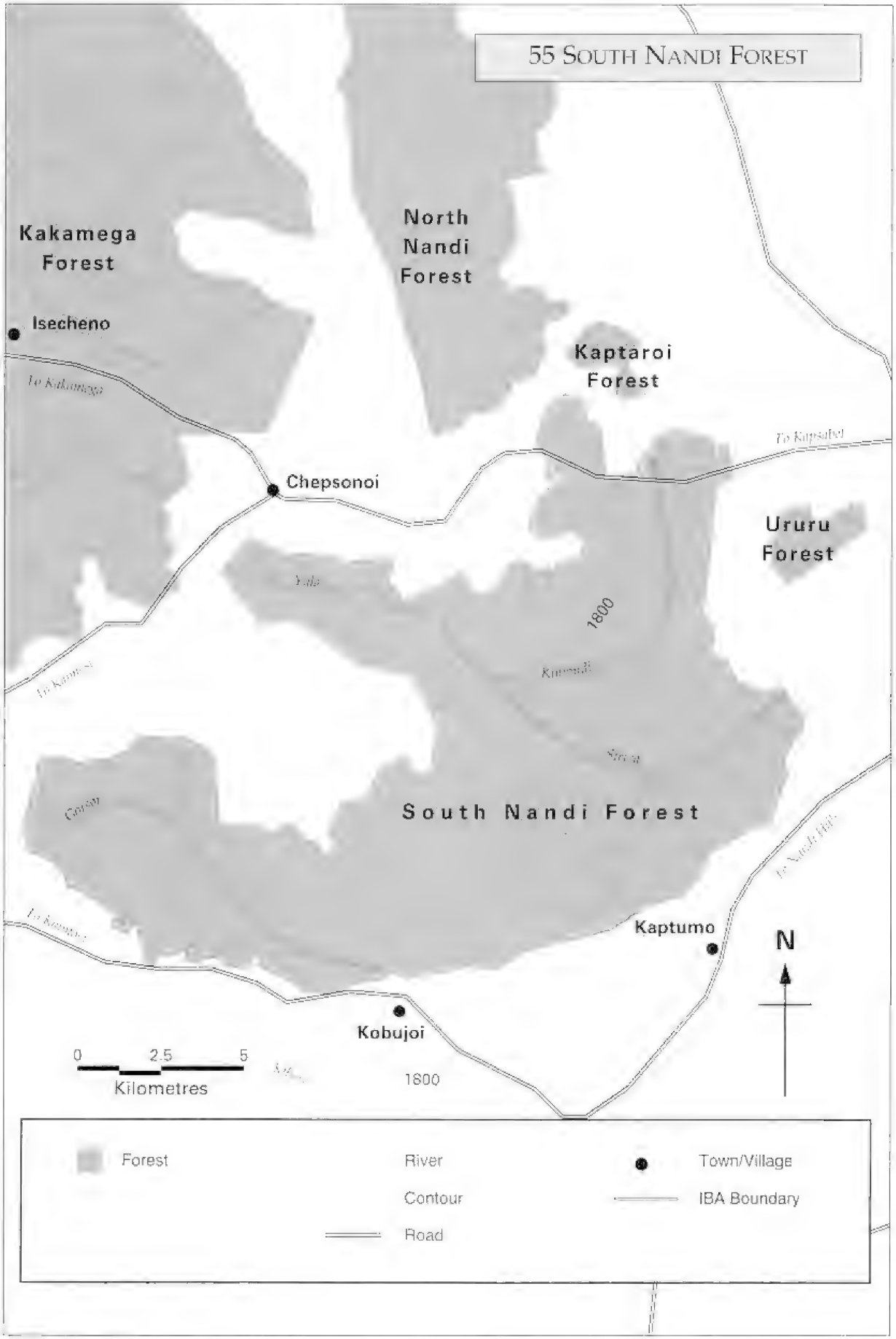
Globally-threatened species

Turner's Eremomela	Vulnerable	South Nandi has exceptionally high densities of this little-known species (around 0.27 groups/ha, equating to 1.1 birds/ha), and is probably its world stronghold. The estimated population is 13,000 birds (Kosgey 1998).

Regionally-threatened species

African Crowned Eagle	Vulnerable	Uncommon resident
Red-chested Owlet	Vulnerable	Present but status unknown
Thick-billed Honeyguide	Vulnerable	Local and uncommon
Least Honeyguide	Vulnerable	Local and uncommon
Grey-chested Illadopsis	Vulnerable	Scarce and very local
Grey-winged Robin	Vulnerable	Local and uncommon
Yellow-bellied Wattle-eye	Vulnerable	Scarce in densely-shaded forest
Southern Hyliota	Endangered	Uncommon in forest canopy

From Zimmerman et al. *(1996), Waiyaki (1998), L. Bennun, unpubl. data*


55 South Nandi Forest
Kakamega Forest
North Nandi Forest
Isecheno
Kaptaroi Forest
To Kakamega
To Kapsabet
Chepsonoi
Ururu Forest
1800
South Nandi Forest
Kaptumo
N
Kobujoi
0 2.5 5
Kilometres
1800
Forest
River
Town/Village
Contour
IBA Boundary
Road

tree species. Of the remaining area, at most around 13,000 ha is closed-canopy forest, the rest being scrub, grassland or cultivation.

Birds

See box and Appendix 3 for key species. South Nandi Forest is almost certainly the most important site in the world for the threatened Turner's Eremomela. The avifauna (like that of North Nandi, IBA 53) is mainly Afromontane (including Grey-chested Illadopsis among its Afrotropical Highlands biome species), but with strong western affinities. There is so far no comprehensive bird list, but the forest holds at least two-thirds (29/43) of the Kenyan species characteristic of the Guinea-Congo Forest biomes. A survey in 1996 (Waiyaki 1998) recorded 111 species of forest birds, including 47 forest specialists (Bennun *et al.* in press).

Other wildlife

South Nandi contains low densities of two threatened mammal species: Leopard *Panthera pardus* and Giant Forest Hog *Hylochoerus meinertzhageni*. Black-and-white Colobus *Colobus guereza* occurs in reasonable numbers. The Bongo *Tragelaphus eurycerus* is reported to occur but there are no confirmed records.

Conservation issues

South Nandi is one of the most threatened IBAs in Kenya. The forest is surrounded by a dense and rapidly growing human population, and pressure on land is very high. Several large excisions have taken place in the recent past, and there is no indication that this process will end soon. Substantial chunks of indigenous forest have also been clear-felled to create the Nyayo Tea Zone and for running a power line from Kobujoi town to a water tank in the forest. Illegal encroachment is a very serious problem. The policing of forest boundaries seems to have failed completely in the south-western sector, and hundreds of hectares have recently been encroached in the Morongiot and Kamaindi areas. Beyond the Nyayo Tea Zone, which was meant to act as a buffer, all the forest undergrowth has been cleared and maize planted as far as the eye can see. Only large trees are left standing, and these are rapidly being converted into charcoal. There is an evident failure to appreciate the biodiversity conservation and water catchment importance of South Nandi, either at the level of land-use planning or the day-to-day work of the Forest Department.

South Nandi has been heavily logged-over in the past, which has severely affected the vegetation structure — some parts have reverted to a thicket formation. For unknown reasons, this forest appears now to be exempted from the general Presidential ban on commercial exploitation of indigenous trees. An Eldoret-based company, Rai Ply, has been logging intensively in several parts of the forest since the early 1990s. The felling targets valuable timber trees (*Prunus africana*, *Olea capensis* and *Ekebergia capensis*) as well as species with lighter wood (*Croton megalocarpus*, *C. macrostachys*, *Polyscias fulva* and *Albizia gummifera*). The logging operation is intensive and appears very poorly managed, with enormous structural damage to the forest as a result. As early as 1993, a survey report (Blackett 1994b) recommended that "the discontinuation of logging should be strongly enforced" because of extensive depletion of the growing stock. The present logging gives the impression of an exercise that is deliberately unsustainable, aiming to extract the maximum amount of timber before commercial exploitation is controlled once again.

Many of the other problems faced by South Nandi are common to indigenous forests all over Kenya (Waiyaki 1998). Tree-poaching and plattorm sawing are rampant in the Kaimosi area, and near other major settlements. Forest antelope are hunted heavily in the eastern sector, where the surrounding human population is lowest; the lack of hunting elsewhere may reflect a lack of wildlife to hunt! Birds are also trapped seasonally, particularly Harlequin Quail in the grasslands. Honey gathering, seemingly a sustainable activity, also constitutes a conservation threat. Honey collectors here frequently fell an entire tree in order to reach one bee's nest. These trees are often large and old, with natural cavities that provide essential nesting sites for a large array of hole-nesting forest birds.

Livestock grazing inside the forest occurs, but may be a less serious problem than at Kakamega. Areas cleared for the development of tea plantations but not planted with tea are heavily grazed, preventing forest regeneration.

South Nandi is especially significant for its population of Turner's Eremomela. A six-month study of this species shows that the birds are most abundant in the low-altitude parts of the forest (which have been substantially encroached by people) and show a strong preference for foraging

in large *Croton* trees (which are one of the particular targets of the commercial loggers).

South Nandi has been unjustly neglected by scientists, conservationists and the forest management authorities alike. A *laissez-faire* approach prevails that seems to allow practically any abuse of the forest to continue unchecked. A proper management plan for the forest, produced with the whole-hearted involvement of both the Forest Department and Kenya Wildlife Service, and incorporating the needs of local people as opposed to industrial timber companies, is urgently needed.

In the meantime, commercial logging should cease, encroachers should be repulsed, and a moratorium should be placed on any further de-gazettements.

Further reading

Kigomo 1987, Blackett 1994b, Waiyaki 1998, Kosgey 1998

Turner's Eremomela

56 South Nguruman

01°50′S, 35°50′E, Rift Valley Province, Narok District

Area undefined: c. 125,000 ha

Altitude: 900–2,300 m

Status: Unprotected

Categories: Globally-threatened species, restricted-range species

Site description

The Nguruman Escarpment forms the western wall of the Rift Valley in southernmost Kenya, some 150 km south-west of Nairobi. The scarp rises steeply in a series of stepped, rocky faults from the floodplain of the Southern Ewaso Ng'iro River on the valley floor at around 900 m to some 2,300 m on the escarpment crest. From here the land falls more gently away to the Loita Plains and the Masai Mara (IBA 50). The vegetation changes from open *Acacia tortilis* woodland on the plain, to dense *Acacia–Commiphora* bush on the lower slopes, to *Tarchonanthus* thicket and grassland and, finally, sub-montane forest. Clear, fast-running, rocky streams flow down the escarpment, fringed on their lower reaches with tall riparian forest of figs *Ficus* spp. Beyond the escarpment crest, the rolling country is a mosaic of grassland, scrub and forest, with *Podocarpus falcatus*, *P. latifolius* and *Diospyros abyssinica* among the trees (Cunningham-van Someren 1977). Rainfall at the base of the eastern scarp is around 400 mm per year, rising to 750 mm on the forested ridges and peaks. Mist and dew can be heavy in the highest areas.

Land on the escarpment and hills is communally owned by several Maasai Group Ranches. One section of the escarpment has been leased to a private company for the development of luxury tourism.

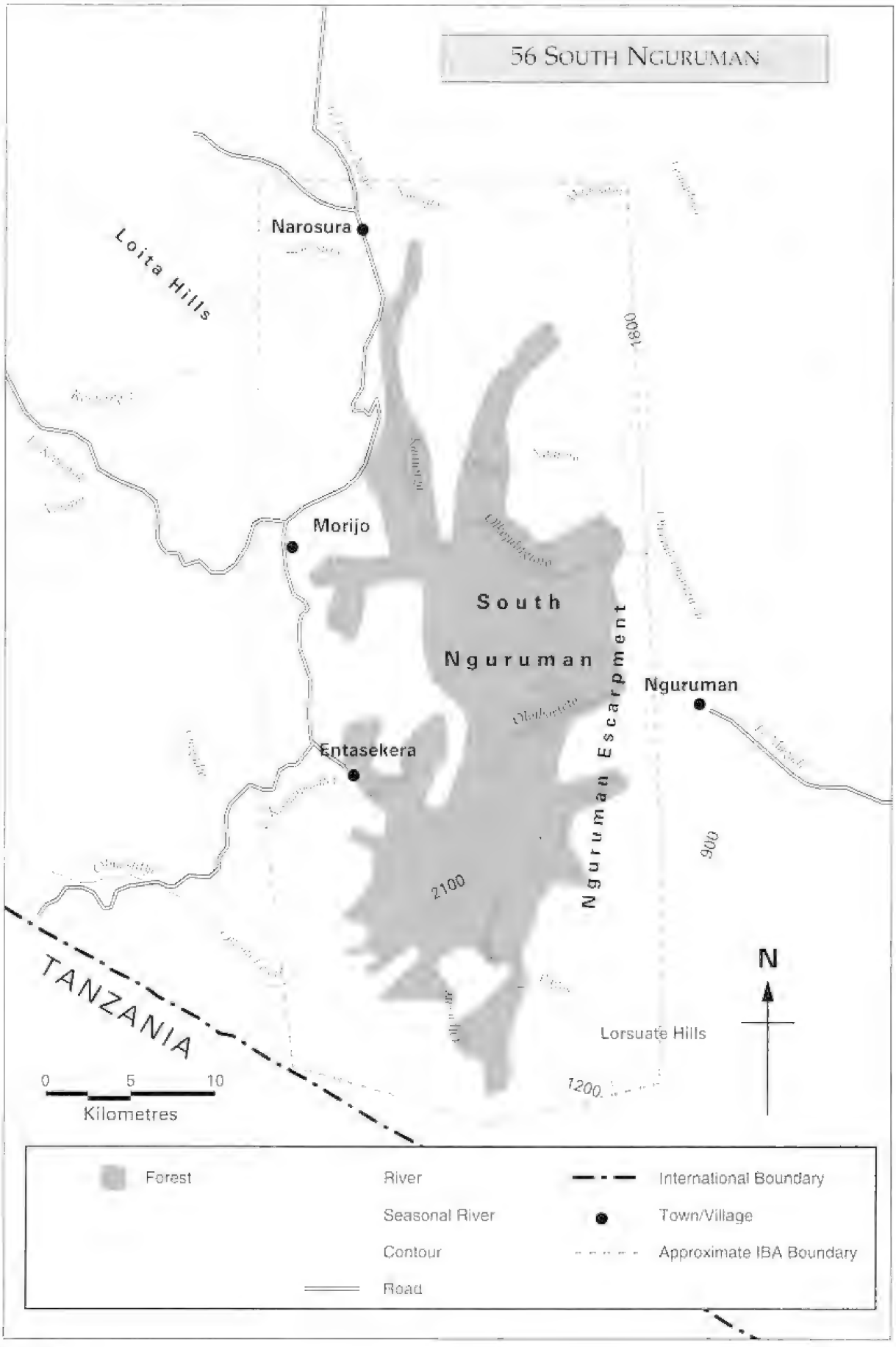
Birds

See box for key species. This is likely to be an important site for the threatened, restricted-range Grey-crested Helmet-shrike, but although recorded here its status is uncertain. It is most likely to be found in *Tarchonanthus* thicket (Bennun 1994c). South Nguruman has very varied habitats and thus supports a diversity of bird species, from those characteristic of the Somali-Masai biome (27/92 Kenyan species), on the lower slopes, to African Highland biome species in the forest (30/67 species). South Nguruman is the only Kenyan site for Brown-headed Apalis and one of the very few for Magpie Shrike. Only parts of the site have been surveyed, and additional species will doubtless be added to the list.

Other wildlife

The site holds substantial populations of large mammals, possibly including Black Rhinoceros *Diceros bicornis* and Hunting Dog *Lycaon pictus*. There is little information on other fauna and flora.

Grey-crested Helmet-shrike


56 South Nguruman
Narosura
Loita Hills
Morijo
South
Nguruman
Nguruman Escarpment
Nguruman
Entasekera
1800
900
2100
1200
TANZANIA
Lorsuate Hills
N
0
5
10
Kilometres
Forest
River
Seasonal River
Contour
Road
International Boundary
Town/Village
Approximate IBA Boundary

Globally-threatened species		
*Grey-crested Helmet-shrike	Vulnerable	Probably an uncommon resident in *Tarchonanthus* scrub (Zimmerman *et al.* 1996)
Red-throated Tit	Near-threatened	Probably resident, in *Acacia* woodland
*Jackson's Widowbird	Near-threatened	Nests in long grassland above the escarpment crest

**also restricted-range species*

Other restricted-range species		
Hunter's Cisticola		At forest edges and in scrub on the escarpment crest

Regionally-threatened species		
Lammergeier	Vulnerable	Status uncertain, may be only an occasional visitor
African Crowned Eagle	Vulnerable	Uncommon resident in forest
Striped Flufftail	Vulnerable	Recorded from high grassland
Purple-throated Cuckoo-shrike	Vulnerable	Uncommon, in highland forest

Data from Zimmerman et al. *(1996)*

Conservation issues

Although it has no formal protection, South Nguruman remains a relatively wild and untouched part of Kenya, with large areas of natural habitats. Tsetse-fly infest much of the lower, bush-covered escarpment, and the Maasai people generally avoid the area for livestock grazing except in drought conditions. The highland forests on the escarpment crest have been traditionally protected by the local communities with considerable success. It is unclear how long this system can continue, as there have been controversial attempts to assert central Government control over this land. South Nguruman is an area of great scenic beauty and has good potential for eco-tourism, although access is not easy. Several small tented lodges have been built in a leased concession on the lower slopes of the escarpment, but the low-volume, luxury safari tourism that was planned has not yet begun.

More information is needed on Nguruman's birds, especially the threatened species, and the conservation status of their habitats: a thorough avifaunal survey is recommended.

Further reading

Cunningham-van Someren 1977

57 Busia Grasslands

00°25'N, 34°15'E, Western Province, Busia District

250 ha

Altitude: 1,200–1,220 m

Status: Unprotected, private or communal land

Categories: Globally-threatened species, Sudan-Guinea savannah biome species

Site description

A chain of small grassland patches (some seasonally flooded) in western Kenya, including Mungatsi (36 ha, 0°27'67"N, 34°19'69"E), Matayo (210 ha, 0°23'01"N, 34°08'73"E), Sikoma (1 ha, 0°24'03"N, 34°11'03"E), and Malanga (3 ha, 0°25'96"N, 34°18'44"E). All the patches are surrounded by intensive agriculture, mainly maize and sugarcane, and are grazed by livestock. The most important of them is Mungatsi, located 2 km from Mungatsi market along the Mungatsi-Munami road. This privately-owned site lies on either side of a small stream (a tributary of the River Sio), which is fringed by riverine forest and scrub.

Birds

See box and Appendix 3 for key species. The Blue Swallow, a globally threatened intra-African migrant, is a non-breeding visitor to this area from April to September. Blue Swallows feed over grassland and over 100 have been recorded roosting at the flooded grassland patch near Mungatsi (D.A. Turner, *in litt.*). The riverine forest and scrub at Mungatsi also holds several Sudan & Guinea Savannah biome species that are not found in other IBAs. This is also the only Kenyan IBA in which Black-shouldered Nightjar and Green Crombec, two Guinea-Congo Forests biome species, are recorded.

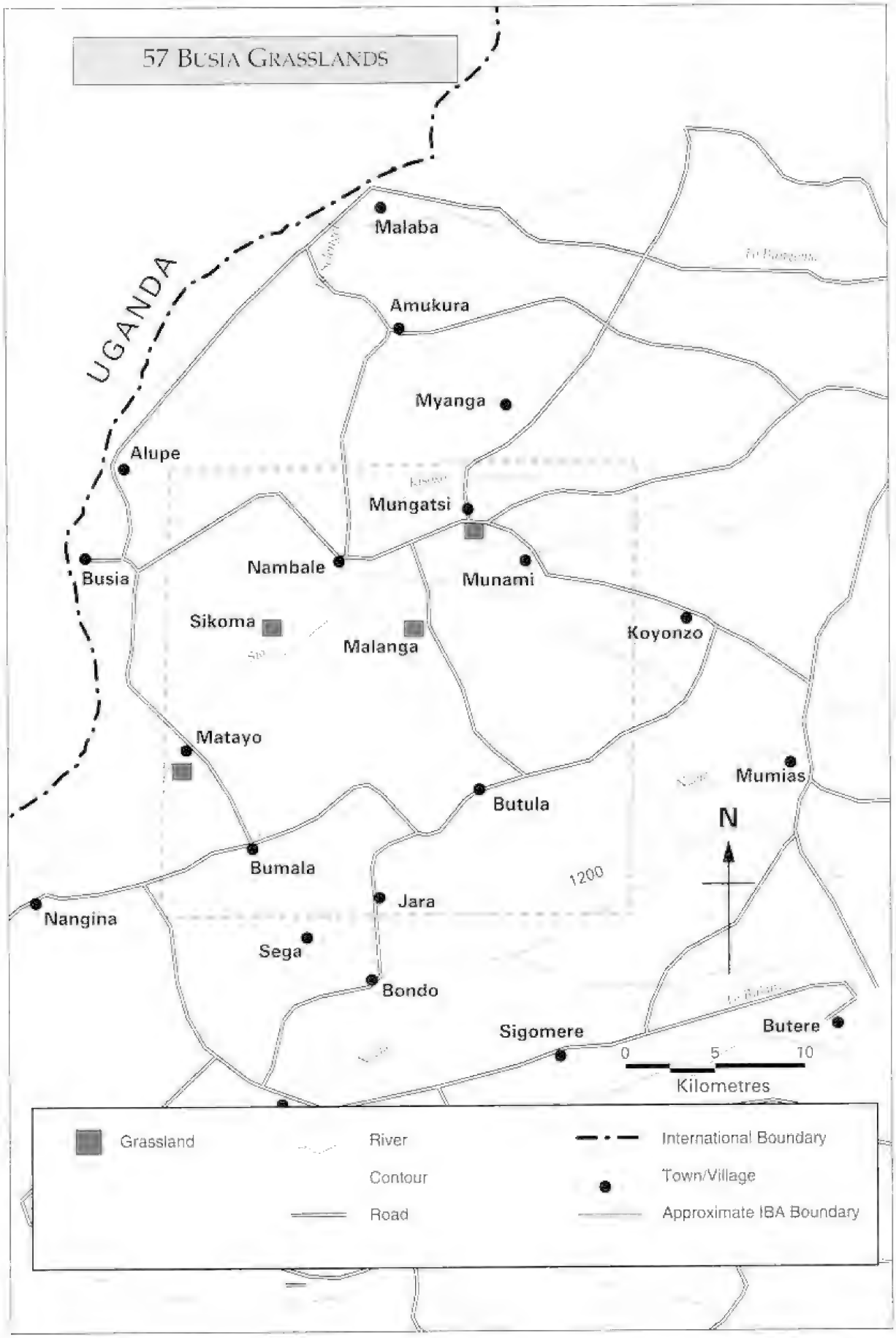
Other wildlife

These vanishing grasslands have been little studied. On biogeographic grounds, they are likely to have close links with Ugandan grasslands and to contain species that are found nowhere else in Kenya.

Conservation issues

The tiny grassland patches in Busia District are under severe and immediate threat. Busia has a high human population density that is increasing very fast, and there is great pressure on land. A sugar factory is now being established in the area and cane growing is being promoted – in 1996, several grassland areas were slated for conversion into sugar-cane plantations (Nasirwa & Njoroge 1997).

Hartlaub's Marsh Widowbird


57 Busia Grasslands
UGANDA
Malaba
Amukura
Myanga
Alupe
Mungatsi
Busia
Nambale
Munami
Sikoma
Malanga
Koyonzo
Matayo
Mumias
Butula
N
Bumala
1200
Jara
Nangina
Sega
Bondo
Sigomere
Butere
0
5
10
Kilometres
Grassland
River
International Boundary
Contour
Town/Village
Road
Approximate IBA Boundary

Globally-threatened species		
Blue Swallow	Vulnerable	Regularly recorded between April and September (Zimmerman *et al.* 1996, Finch 1989)
Great Snipe	Near-threatened	Uncommon Palaearctic migrant, likely to occur here regularly but status uncertain
Regionally-threatened species		
Banded Snake Eagle	Vulnerable	In riverine woodland
Shining-blue Kingfisher	Vulnerable	Has been recorded at Mungatsi (Zimmerman *et al.* 1996)
Hartlaub's Marsh Widowbird	Vulnerable	Nests in flooded grassland

These developments may spell doom to the small pockets of grassland on which the Blue Swallow depends.

Swallows move long distances in search of prey (Turner & Rose 1989), which suggests that a mosaic of grasslands could sustain a wintering population. However, the presence of a suitable roosting site may be critical. Protection of Mungatsi, by land purchase if there is no other option, is an urgent priority. This site is also home to a number of other bird species that are difficult to find elsewhere in Kenya, such as the Green Crombec. It is already visited by many birdwatching groups and has potential for small-scale bird tourism.

Further reading

Nasirwa & Njoroge 1997

58 KAKAMEGA FOREST

00°17′N, 34°53′E, Western Province, Kakamega District

18,300 ha (c. 12,000 ha forest)

Altitude: 1,550–1,650 m

Status: Forest Reserve and part National Reserve

Categories: Globally-threatened species, restricted-range species, Guinea-Congo Forests biome species

Site description

Kakamega Forest is a mid-altitude tropical rainforest, the easternmost outlier of the Congo Basin forests. Its West African affinities are unique in Kenya, and the forest contains many species found nowhere else in the country. The forest lies in the Lake Victoria catchment, about 40 km north of Kisumu, and just east of the Nandi Escarpment that forms the edge of the central highlands. It was first gazetted as Trust Forest in 1933, and two small Nature Reserves, Yala and Isecheno (totalling about 700 ha), were established within the Forest Reserve in 1967. In 1986, nearly 4,000 ha of the northern portion of the forest, along with the adjacent 457 ha Kisere Forest, were gazetted as a National Reserve, managed by the Kenya Wildlife Service.

Only an estimated 10,000 ha of the overall gazetted area is still closed-canopy indigenous forest (Blackett 1994c), of which some 3,200 ha is in the National Reserve. The remaining area consists of grassy and bushed glades (some natural, some maintained by fire or grazing), tea, cultivation and 1,700 ha of plantations (some more than 30 years old) of softwoods and commercially valuable hardwoods.

Kakamega Forest is an important water catchment; the Isiukhu and Yala Rivers flow through the forest and gather tributaries from it. The terrain is undulating, with often steep-sided river valleys. The soils are well-drained, deep, heavily leached, clay-loams and clays, of generally low fertility (Blackett 1994c). Rainfall is approximately 2,000 mm per year, decreasing from south to north, and apparently declining due to deforestation.

Birds

See box and Appendix 3 for key species. The avifauna is well known, rich, and unusual in its composition. Two globally-threatened species occur, Chapin's Flycatcher (also restricted-range) and Turner's Eremomela. The 194 forest-dependent bird species (the highest total for any Kenyan forest) include 40 of Kenya's 43 Guinea-Congo Forests biome species, as well as 33 of Kenya's 67 Afrotropical Highlands biome species (notably Chapin's Flycatcher and Grey-chested Illadopsis). The mixture reflects Kakamega's altitudinal position between lowland and montane forest.

Kakamega's avifauna is unique not only nationally, but continentally. Several species have isolated, relict populations here, including Ansorge's Greenbul, Blue-headed Bee-eater, Chapin's Flycatcher and Turner's Eremomela, which are absent from all or nearly all of the superficially similar mid-elevation forests in Uganda. Chapin's Flycatcher is a restricted-range species that characterises the Kakamega and Nandi Forests Secondary Area, and is also present in the Albertine Rift Mountains Endemic Bird Area (Stattersfield *et al.* 1998). The presence of the eremomela indicates biogeographic links to the Eastern Zaire Lowlands Endemic Bird Area. Kakamega itself has few endemic taxa; among birds, there is an endemic sub-species (*kaviromdensis*) of Ansorge's Greenbul.

Red-chested Owlet


58 KAKAMEGA FOREST
1500
Lukume
Mwanza
Kisere Forest
Magole
North Nandi Forest
Udo's Camp
Kakamega National Reserve
Lukhusi
Kakamega Forest
Kakamega
Isecheno Forest Station
2100
Shinyalu
Shibuye
Rivendell Gardens
Khayega
1500
Rondo Retreat Centre
1800
Chepsonoi
N
Shikondi
South Nandi Forest
0 5 10
Kilometres
Forest
National Reserve
River
Contour
Road
Hotel/Lodge
Campsite/bandas
Town/Village
IBA Boundary

Globally-threatened species

*Chapin's Flycatcher	Vulnerable	Scarce resident (Zimmerman et al. 1996)
Turner's Eremomela	Vulnerable	Reasonably common (Lewis & Pomeroy 1989, Bennun *et al.*, unpubl. data)

* *also restricted-range species*

Regionally-threatened species

Banded Snake Eagle	Vulnerable	Fairly common resident
Ayres's Hawk Eagle	Vulnerable	Appears to be more abundant here than in many parts of its range
African Crowned Eagle	Vulnerable	Resident in small numbers
African Grass Owl	Vulnerable	In grassy glades; no recent records. May be only a vagrant.
Red-chested Owlet	Vulnerable	Widespread at low density in closed-canopy forest
Least Honeyguide	Vulnerable	Not uncommon in closed-canopy forest
Thick-billed Honeyguide	Vulnerable	Uncommon in closed-canopy forest
Cassin's Honeybird	Vulnerable	Rare, with few recent records
Toro Olive Greenbul	Vulnerable	Not uncommon, but rarely recorded
Grey-chested Illadopsis	Vulnerable	Extremely local and generally scarce
Grey-winged Robin	Vulnerable	Patchily distributed, often close to streams and rivers
Southern Hyliota	Endangered	Uncommon in forest canopy
Yellow-bellied Wattle-eye	Vulnerable	Very local, preferring densely shaded forest with many trees in the lower canopy
Purple-throated Cuckoo Shrike	Vulnerable	Rarely recorded
Hartlaub's Marsh Widowbird	Vulnerable	Occurs locally in grassy glades

From Bennun & Waiyaki (1992c), L. Bennun & J. Oyugi (unpubl. data), T. Brooks (in litt.)*, Zimmerman* et al. *(1996)*

At least 16 bird species occur in Kakamega but nowhere else in Kenya, and another 30 (such as the Grey Parrot) are probably now confined to this site. The grassy glades have their own distinctive avifauna, with many moist-grassland species that are now rare elsewhere in western Kenya.

Other wildlife

The forest holds large populations of Black-and-white Colobus *Colobus guereza* and Red-tailed Monkey *Cercopithecus ascanius schmidti*, and small numbers (mainly in Kisere: Wahome 1992) of de Brazza Monkey *Cercopithecus neglectus*. Several West

African forest mammals occur, such as Potto *Perodicticus potto*, Giant Otter Shrew *Potamogale velox* and Lord Derby's Anomalure *Anomalurus derbianus*. The small mammal community is also very rich and shows strong affinities to the Zaire basin. At least 28 snake species are recorded, including the rare Gold's Cobra *Pseudoluje goldii* and other West African species such as the Barred Green Snake *Philothamnus heterodermus carinatus*, Black-lined Green Snake *Hapsidophrys lineata*, Jameson's Mamba *Dendroaspis jamesoni kaimosae*, Green Bush-viper *Atheris squamiger squamiger*, Prickly Bush-viper *Atheris hispida* and Rhinoceros-horned Viper *Bitis nasicornis* (Spawls 1978). Two notable and probably endangered forest amphibians, *Leptopelis modestus* and *Hyperolius lateralis*, are recorded (Duff-MacKay 1980). The forest's butterfly fauna is very diverse and important, both regionally and continentally; around 350 species are thought to occur, including at least one endemic species, *Metisella kakamega*, and a near-endemic, *Euphaedra rex* (Larsen 1991).

Kakamega has a rich diversity of trees, with common genera including *Croton*, *Celtis*, *Trema*, *Antiaris*, *Bequaertiodendron* and *Zanthoxylum* (Beentje 1990). Endemism is low, however, the only woody endemic being the liana *Tiliacora kenyensis*.

Conservation issues

Kakamega is a complex and fragmented forest, and one that has been under attack, from inside and out, for many years. Logging for commercially valuable timber, and clear-felling of indigenous forest to make way for plantations, was extensive under the colonial Forest Service and continued until the late 1980s. This began the process of isolating the northern and southern blocks. Excisions for settlement, schools and tea plantations (the 'Nyayo Tea Zones') have claimed additional chunks of the forest. Kakamega District is one of the most densely populated in Kenya, and human pressure on the forest is extremely intense. Local people are estimated to derive products worth KSh 100 million (approximately US$ 1.7 million) from the forest each year (Emerton 1994). Forest protection remains totally inadequate, especially in the southern sector under the management of the Forest Department. Agricultural encroachment has led to large-scale destruction (e.g. within Yala Nature Reserve) in recent years, and illegal tree-felling and charcoal burning are rampant (Oyugi 1996, L. Bennun, unpubl. data). Forest and glade grazing of livestock, allowed once again by Presidential decree in 1994, prevents tree regeneration and causes policing problems. Hunting for bush-meat, debarking of certain trees for traditional medicine, and firewood collection (estimated at 100,000 m^3 per year by Emerton (1994)) are also serious problems.

Continuing forest fragmentation and destruction in Kakamega appears to have taken its toll on the avifauna. Some forest species, such as Yellow-mantled Weaver, have not been recorded for many years, and may now be locally extinct. A number of montane forest birds that formerly occurred here, such as Hartlaub's Turaco and Fine-banded Woodpecker, seem to have disappeared since the severing of forest connections with the nearby, higher altitude North Nandi Forest (IBA 53).

An innovative conservation plan for Kakamega was developed in the early 1990s by the Kenya Indigenous Forest Conservation Programme (KIFCON), but has never been implemented. This proposed a number of mechanisms for balancing the needs of biodiversity conservation and forest-adjacent communities, including a forest-zoning approach (Wass 1995). These ideas should be revisited and, where appropriate, revived. An integral part of this plan was eco-tourist development. The forest is one of Kenya's top bird-watching destinations, and has enormous potential for tourism if properly protected. A forest guides association, whose members are skilled local naturalists, already exists. This is one obvious means of generating revenue to help conserve Kakamega's immensely important biodiversity.

Further reading

Tennant 1965, Zimmerman 1972, Diamond & Fayad 1979, Angwin 1980, Mann 1980, 1985, Kigomo 1987, Kokwaro 1988, Savalli 1989, 1991, Bennun & Waiyaki 1992c, Mutangah & Mwaura 1992, Rowell 1992, Bennun 1994a, Blackett 1994c, Emerton 1994, Oyugi 1996

59 Mt Elgon

01°02'N, 34°48'E, Western Province, Mt Elgon District and Rift Valley Province, Trans Nzoia District

c. 129,000 ha

Altitude: 2,100–4,280 m

Status: National Park (16,900 ha), Forest Reserve (73,000 ha) and unprotected (exact area unknown, c. 17,000 ha of moorland and c. 31,000 ha of wooded grassland)

Categories: Globally-threatened species, restricted-range species, Afrotropical Highlands biome species

Site description

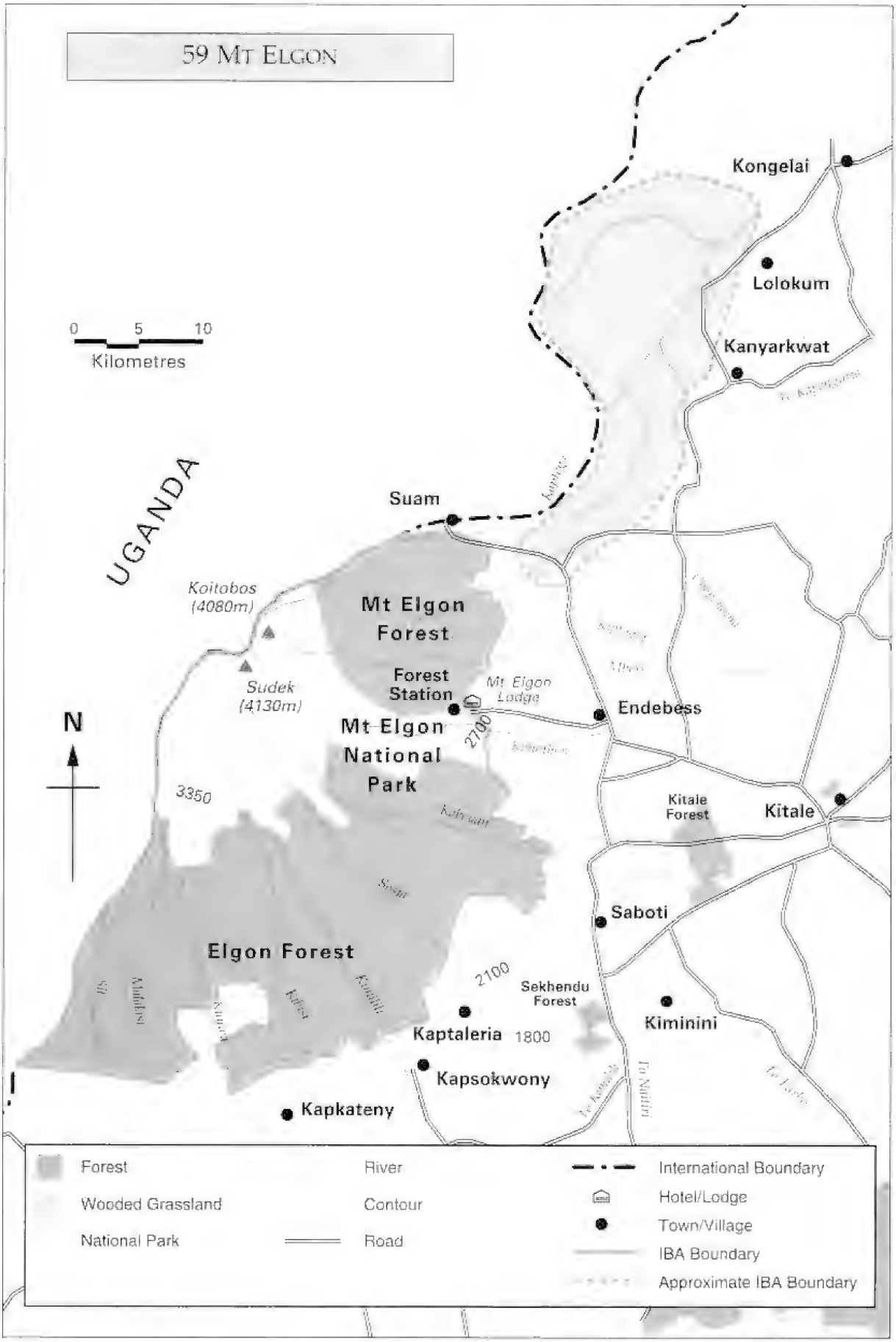
Montane forest, wooded grassland, bamboo and alpine moorland on the eastern slopes of Mt Elgon, Kenya's second-highest mountain. Mt Elgon lies about 140 km north-east of Lake Victoria and is bisected by the Kenya–Uganda border. It is an ancient, eroded volcano with a huge caldera and, on its summit, the spectacular flat-topped basalt column known as Koitobos. Another unique feature of the mountain is the 'lava tube' caves, some over 60 m wide and frequented by elephants (and other animals) digging for salts.

The mountain soils are red laterite, and rainfall is around 1,200 mm on the mid-slopes. The vegetation is zoned by altitude, with wet montane forest dominated by *Olea capensis* and *Aningeria adolfi-friedericii* grading into *Olea–Podocarpus falcatus* forest, a zone of mixed *Podocarpus* and bamboo *Arundinaria alpina*, and the *Hagenia abyssinica* zone with Giant Heath *Erica arborea* and *E. trimera elgonensis*. Afro-alpine moorlands occupy the highest parts of the mountain, with tussock grasses such as *Festuca pilgeri*, bogs of *Carex runssorocensis*, giant groundsels and giant lobelias. Open wooded grassland with *Erythrina* and *Combretum* covers part of the lower, drier north-eastern slopes, extending along the Uganda border towards Kongelai to the north-east.

Mt Elgon National Park (16,900 ha, gazetted in 1968) covers a narrow transect up the north-eastern slopes of the mountain, from lower montane forest to the caldera edge. The remaining forest and moorland (73,000 ha) is part of Mt Elgon Forest Reserve. The north-eastern wooded grassland, which is of unknown area, is unprotected. The Ugandan side of the mountain, above about 2,000 m, is protected within Uganda's Mount Elgon National Park (Wily 1993, Hoefsloot & Onyango 1995).

Mt Elgon is an important water catchment for the Nzoia River, which flows into Lake Victoria, and for the Turkwel River, which flows into Lake Turkana (IBA 28).

Slender-billed Starling


59 Mt Elgon
Kongelai
Lolokum
Kanyarkwat
0 5 10
Kilometres
UGANDA
Suam
Koitobos
(4080m)
Mt Elgon
Forest
Forest
Station
Mt Elgon
Lodge
Sudek
(4130m)
Endebess
N
Mt Elgon
National
Park
2700
3350
Kitale
Forest
Kitale
Saboti
Elgon Forest
2100
Sekhendu
Forest
Kaptaleria
1800
Kiminini
Kapsokwony
Kapkateny
Forest
Wooded Grassland
National Park
River
Contour
Road
International Boundary
Hotel/Lodge
Town/Village
IBA Boundary
Approximate IBA Boundary

Globally-threatened species

*Sharpe's Longclaw	Provisionally vulnerable (Bennun & Njoroge 1996)	Local and uncommon on the moorland (Britton & Sugg 1973, Zimmerman *et al.* 1996)

**also restricted-range species*

Regionally-threatened species

Lammergeier	Endangered	Probably nests on the high crags
African Crowned Eagle	Vulnerable	Resident in small numbers
Ring-necked Francolin	Vulnerable	Recorded from lower southern and north-eastern slopes, outside forest; very scarce
Striped Flufftail	Vulnerable	Scarce resident of moorland
Cape Eagle Owl	Vulnerable	Nests on high moorland crags
Red-chested Owlet	Vulnerable	Uncommon in closed-canopy forest
Thick-billed Honeyguide	Vulnerable	Uncommon in closed-canopy forest
Toro Olive Greenbul	Vulnerable	Formerly occurred in the lower forest; may be extinct
Grey-chested Illadopsis	Vulnerable	Formerly occurred in the lower forest; may be extinct
Grey-winged Robin	Vulnerable	Uncommon at the fringes of lower forest
Purple-throated Cuckoo-shrike	Vulnerable	Uncommon in closed-canopy forest

Data from Britton & Sugg (1973), Zimmerman et al. *(1996)*

Other restricted-range species

Hunter's Cisticola	Common above 2,500 m, below which it is replaced by Chubb's Cisticola (Britton & Sugg 1973, Britton 1980)
Jackson's Francolin	Status uncertain; one sight record (Zimmerman *et al.* 1996)

Birds

See box and Appendix 3 for key species. The restricted-range, provisionally threatened Sharpe's Longclaw occurs on the moorland (where it has been collected at 3,400 m: Britton & Sugg 1973). Mt Elgon has a rich montane avifauna, with 51 of Kenya's 67 Afrotropical Highland biome species (Appendix 3). The wooded grasslands on the north-eastern side hold a number of unusual birds, including seven Sudan and Guinea Savannah biome species that have very restricted ranges in Kenya. Nineteen of Kenya's 41 Guinea-Congo Forests biome species have been recorded, although as many as 10 of these may now be extinct (Appendix 3). This is the only IBA in Kenya where the Ring-necked Francolin, a Lake Victoria biome species, is known to occur. The Mt Elgon grasslands hold just two Somali-Masai biome species, but one of these, Boran Cisticola, is found in no other site.

Other wildlife

The threatened African Golden Cat *Felis aurata* has been recorded in this forest but its status is unknown. Other Red Data Book-listed species include Leopard *Panthera pardus* and African Elephant *Loxodonta africana*. Bongo *Tragelaphus eurycerus*, a declining and uncommon species in Kenya, also occurs. There is a distinctive endemic race of Bushbuck, *Tragelaphus scriptus hetercheurus*, and several endemic small mammals, including the Mt Elgon Musk Shrew *Crocidura elgonius*, Mt Elgon Mole-rat *Tachyoryctes ruddi* and Mt Elgon Pygmy Mouse *Mus sorella*. The frog *Anthroleptides dutoiti* is known only from one specimen collected from the Koitobos River on Mt Elgon in 1980 (Duff-MacKay 1980).

Notable alpine plants include *Senecio johnstonii elgonensis*, *Lobelia deckenii elgonensis*, *Lobelia cheranganiensis*, *Alchemilla elgonsis*, *A. microbetula* and *Helichrysum amblyphyllum*, all of which are endemic or near-endemic to Mt Elgon.

Conservation issues

The Mt Elgon forest has suffered severely from encroachment on the lower slopes: very little lower-altitude forest remains, and a number of forest bird species formerly known from below 2,000 m are almost certainly extinct. The forests contain valuable timber, in particular Elgon Olive *Olea capensis*. Illegal timber extraction and (more recently) licensed commercial logging by Rai-Ply, an Eldoret-based company, have done tremendous damage to the forest structure. The recent, apparently uncontrolled devastation of substantial areas by a commercial concern has been severe enough to spark protests and demonstrations by those living around the forest.

Mt Elgon faces similar management problems to most other forests in Kenya, with the Forest Department finding difficulties in controlling fuelwood collection, fires set by honey hunters, collection of poles, de-barking of medicinal trees, and forest grazing. The moorland has also suffered damage from fires set during drought periods (Ekkens 1988), though there is evidence that some of the vegetation communities there are fire-maintained (Beck *et al.* 1987). The wooded grasslands on the north-east are an unprotected and undervalued habitat whose special birds are in imminent danger of disappearing, as expansion of cultivation and destruction of habitat continue apace. The mountain lies across the international border, which has made it difficult to control the poaching of large animals on the Kenyan side, and organised smuggling has at times created a security problem, deterring visitors to the National Park. This is unfortunate, because Mt Elgon has many attractions. The moorland and peaks have great scenic beauty, the caves and their elephant visitors are fascinating, and a wide range of mammals, birds and vegetation can be seen during a short visit.

Surveys are needed to establish the status of Sharpe's Longclaw on the moorland, and the effects of seasonal burning on this species; to map out the wooded grassland and assess the populations of Sudan and Guinea Savanna biome species; and to assess the current status of the forest birds, especially those thought to have become extinct. In the meantime, commercial logging in the forest should cease. An integrated management plan for Mt Elgon is needed that will take into account the conservation requirements of all its habitats, develop the mountain's enormous potential for eco-tourism, and put the interests of local people and sustainable use of resources above destructive, short-term exploitation.

Further reading

Britton & Sugg 1973, Beck *et al.* 1987

60 Sio Port Swamp

00°14′N, 34°51′E, Western Province, Busia District

c. 400 ha

Altitude: 1,130 m

Status: Unprotected

Categories: Globally-threatened species, Lake Victoria Basin biome species

Site description

A papyrus *Cyperus papyrus* swamp at the extreme north of the Kenyan section of Lake Victoria, on the Kenya/Uganda border. The site consists of mature, almost undisturbed, continuous papyrus stands, stretching from the mouth of the Sio River southwards for about 3.5 km along the lakeshore.

Birds

See box and Appendix 3 for key species. This is an important site for Lake Victoria biome species, especially three papyrus endemics: Papyrus Gonolek, White-winged Warbler and Papyrus Canary. The threatened Papyrus Yellow Warbler is not yet recorded but is likely to occur.

Other wildlife

No information is available.

Conservation issues

Sio Port is an important site because of the size of the swamp and its relatively pristine condition. Like other papyrus swamps around Lake Victoria, it is increasingly threatened by unsustainable use, and is in urgent need of better protection. Infestation by the exotic Water Hyacinth *Eichhornia crassipes* in many parts of the lake has prevented fishermen from fishing (e.g. Johnstone & Githongo 1997), forcing them to seek alternative forms of livelihood and adding greatly to the human pressure on wetlands. Papyrus shows remarkable powers of regeneration, but excessive cutting for the local mat-making industry, combined with large-scale clearing for cultivating rice and other crops, could rapidly destroy this wetland. Further survey work needs to be carried out at Sio Port to establish whether the threatened Papyrus Yellow Warbler is present, and if so, at what densities.

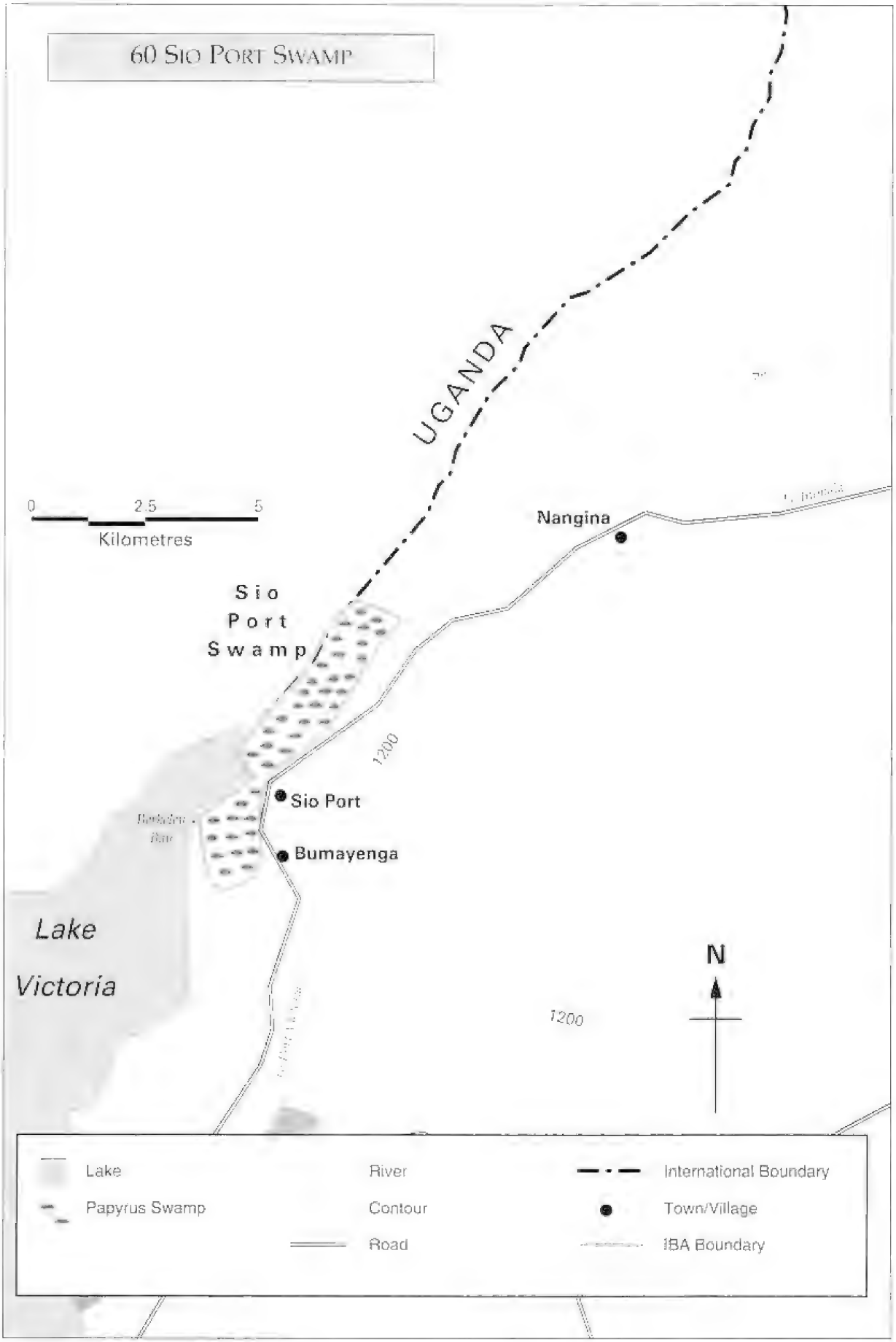
Further reading

Nasirwa & Njoroge 1997

Northern Brown-throated Weaver

Globally-threatened species

Papyrus Gonolek	Near-threatened	Relatively common (Nasirwa & Njoroge 1997)
(Papyrus Yellow Warbler	Vulnerable	Not yet recorded but likely to occur)


60 Sio Port Swamp
UGANDA
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2.5
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Kilometres
Nangina
Sio
Port
Swamp
1200
Sio Port
Bumayenga
Lake
Victoria
N
1200
Lake
Papyrus Swamp
River
Contour
Road
International Boundary
Town/Village
IBA Boundary

4.3 Potential IBAs

At least five sites in Kenya are thought likely to qualify as Important Bird Areas, but for a variety of reasons have not been included in the main inventory. For the time being they are classed as potential IBAs because of lack of sufficient reliable information on their avifauna, or because the taxonomic status of key species is unresolved. These (and other) sites may be added to the list of Kenya's IBAs when more information becomes available.

The five sites (coded with a 'P' to distinguish them from the 60 listed IBAs) are:

P1 Boni and Dodori Forests
P2 Kongelai Escarpment
P3 Malkamari National Park
P4 Mt Kasigau Forest
P5 Mt Kulal Forest

P1 Boni and Dodori Forests

01°43'S, 41°10'E, Coast Province, Lamu District
249,600 ha (extent of forest unknown)
Altitude: 0–100 m
Status: National Reserve (221,600 ha) and proposed, ungazetted Forest Reserve (28,000 ha)
Potential categories: Globally-threatened species, East African Coast biome species

Site description

Boni and Dodori lie on the extreme north-east coast of Kenya, between Kiunga Marine National Reserve (IBA 15) and the Kenya–Somalia border.

Two national reserves were gazetted here in 1976. Boni National Reserve (133,900 ha) abuts the international border. Dodori (87,700 ha) is to the south-west, lying parallel to Kiunga Marine National Reserve. Between these reserves, and connecting them, lies the proposed Boni Forest Reserve (originally 18,500 ha). South-west of Dodori NR is the proposed Lunghi Forest Reserve (originally 9,500 ha). Although proposed as Forest Reserves in 1950, neither site has been demarcated for gazettement.

The area is mainly flat coastal plain, with a braided drainage system separated by marine sands and clay ridges. Rainfall ranges from about 500 to 800 mm per year, and is highest in the south-west. Towards the coast, several parallel fossilised sand dunes run south-west to north-east, the highest (the Mundane Range) reaching 100 m.

Dodori National Reserve contains dense lowland dry forest, dominated by species of *Manilkara* and *Cynometra*, and surrounded by dry bushland. There are occasional grass flood meadows in the alluvial valley of the Dodori River, and groundwater forests along its course. Elsewhere is a mix of bushland, grassland, woodland and groundwater forest. The forest occurs in patches, occupying slightly raised land in areas that are subject to seasonal flooding. Mangrove swamps occur along the Dodori creek.

It is unclear how much coastal forest is present altogether, but it is only one of a number of habitats in these reserves.

Birds

Very little is known about the birds in these forests, and there has been no recent survey because of security concerns. As examples of East African coastal forest (Mlingwa *et al.*, in press), Boni and Dodori are likely to hold species characteristic of the East African Coast biome, possibly including globally-threatened species such as Sokoke Pipit. The Cheyney Expedition in the early 1970s (Anon., 1973) recorded the restricted-range Fischer's Turaco, and four East African Coast biome species (Mombasa Woodpecker, Fischer's Greenbul, Chestnut-fronted Helmet-shrike and Black-bellied Starling).

Other wildlife

Boni and Dodori used to be a concentration area for African Elephants *Loxodonta africana* during the dry season. Elephants are now probably extirpated by poaching. Notable trees in the groundwater forests include *Homalium abdessamadii*, *Croton megalocarpoides*, *Croton polytrichus*, *Excoecaria bussei* and the cycad *Encephalartos hildebrandtii* (Robertson & Luke 1993).

Conservation issues

The National Reserves are under the jurisdiction of Lamu Country Council but it is unclear what management measures are in place. Demarcation of the proposed Boni and Lunghi Forest Reserves stopped in 1976. This followed changes in formerly demarcated boundaries, and resettlement of the Boni people in areas originally proposed as part of the Forest Reserves (Robertson & Luke 1993). Burning

by the Boni people (who are now mainly cultivators) appears to be clearing substantial areas of forest every year. Valuable large trees such as *Brachylaena huillensis* and *Combretum schumanii* are being extracted for the carving industry further south on the coast. However, the area is still sparsely populated due to poor security — which in turn renders these forests largely inaccessible for survey or for eco-tourism. Bird surveys here are a priority when the situation allows.

Further reading

Robertson and Luke 1993, Mlingwa *et al.* in press

P2 Kongelai Escarpment

01°18'N, 35°04'E, Rift Valley Province, West Pokot District
Area undefined
Altitude: 1,360–2,100 m
Status: Unprotected
Potential categories: Sudan and Guinea Savannah biome species

Site description

The Kongelai Escarpment, north of Kitale, drops rapidly over some 25 km from Kapenguria to Kongelai, on the Suam River. The vegetation changes accordingly from remnant montane forest through *Combretum–Terminalia–Acacia* woodland and bush, to semi-arid bushland with wooded watercourses lined with *Acacia* trees.

Birds

Kongelai is rich in birds, with over 300 species recorded (Williams 1967). These include nine of Kenya's 13 Sudan and Guinea Savannah biome species, namely Fox Kestrel (an occasional visitor), White-crested Turaco, Speckle-breasted Woodpecker, Foxy Cisticola (no recent records), Yellow-billed Shrike, Purple and Bronze-tailed Starlings, Chestnut-crowned Sparrow Weaver and Heuglin's Masked Weaver (Moore 1982, Zimmerman *et al.* 1996). These species have varied habitat and altitudinal preferences and are not necessarily to be found together.

Conservation issues

No information is available on conservation issues. As elsewhere in Kenya, habitat degradation is likely to be accelerating. Without survey work to delimit habitats and bird distributions, it is impossible to define the boundaries of an IBA at this site.

P3 Malkamari National Park

04°16'N, 40°46'E, North-eastern Province, Mandera District
87,600 ha
Altitude: 360–770 m
Status: National Park
Potential categories: Restricted-range species, Somali-Masai biome species

Site description

Malkamari National Park lies along the Daua River on the Kenya–Ethiopia border, in the extreme north-east of Kenya, on the Mandera Plateau. The area is largely semi-arid bushland and scrubby grassland, with riparian woodland and palms along the Daua River. Malkamari was gazetted as a National Park in 1989, due to its reportedly high concentration of wildlife.

Birds

Little is known about the avifauna of this remote and little-visited site. However, Africa White-winged Dove and Juba Weaver, two species of the Jubba and Shabelle Valleys Endemic Bird Area (Stattersfield *et al.* 1998) are likely to occur along the Daua River. This EBA is not represented elsewhere in Kenya. Other species of the Somali-Masai biome are also likely to occur.

Other wildlife

The park is reportedly rich in wildlife. There are unsubstantiated records of African Elephant *Loxodonta africana* and Black Rhinoceros *Diceros bicornis* (both Red Data Book species). The site is also considered a centre for plant endemism (NBU 1992).

Conservation issues

There is no information on conservation issues at this site.

Chestnut-throated Apalis

P4 Mt Kasigau Forest

03°50'S, 38°40'E, Coast Province, Taita-Taveta District
c. 230 ha
Altitude: 1,250–1,640 m
Status: Forest Reserve
Potential categories: Globally-threatened species, restricted-range species

Site description

Mt Kasigau is an isolated, steep-sided mountain rising abruptly from the plains approximately 50 km south-east of the main Taita Hills massif (see IBA 21). Above about 1,250 m the summit is covered with cloud forest. Characteristic trees include *Cola greenwayi*, *Nesteonia huchnanii*, *Syzygium* and *Diospyros*. At lower altitudes, this grades into tall *Newtonia buchnanii* woodland, then low woodland and thickets dominated by *Dombeya*, *Brachylaena*, *Vangueira*, *Commiphora* and *Euphorbia*, and finally low scrub and bush near the base, at around 700 m. Mt Kasigau has geological and biogeographic affinities with the nearby Taita Hills (IBA 21).

Birds

Kasigau has not been adequately surveyed until relatively recently. An expedition in 1998 (Barnes *et al.* 1998, Pilgrim, in press) recorded good numbers of the threatened Taita White-eye but not the other Taita Hills endemic taxa (Taita Thrush and Taita Apalis). The cliffs appear to be important for nesting raptors.

The Taita White-eye is recognised as a (globally threatened and restricted-range) species by Collar et al. (1994), but as a sub-species of Montane White-eye by OS-c (1996) and Zimmerman *et al.* (1996). The status of this taxon is uncertain and the results of genetic analysis are awaited. The Taita White-eye is listed as Critically Endangered, but it appears to be relatively adaptable and numerous both on the Taita Hills and Mt Kasigau. An ecological study is ongoing (R. Mulwa, *in litt.*), and it is possible that the species' threat status may be down-graded.

Other wildlife

The tree *Memecylon greenwayi* is endemic to Mt. Kasigau. The Taita Hills endemic *Psychotria taitensis* is found here, and probably other Taita Hills specialities also occur.

Conservation issues

The indigenous forest on the summit of Mt Kasigau is relatively undisturbed (Pilgrim, in press), thanks to a combination of the mountain's precipitous slopes and its importance as a water catchment for surrounding villages. However, the construction of a water pipeline has opened up the lower slopes to pole harvesting and grazing. There appears to be a high level of conservation awareness among the local people (Pilgrim, in press) and good potential for eco-tourism (Barnes *et al.* 1998).

Further reading

Barnes *et al.* 1998, Pilgrim in press

P5 Mt Kulal Forest

02°40'N, 36°50'E, Eastern Province, Marsabit District
c. 4,000 ha of forest, within a biosphere reserve of 700,000 ha
Altitude: 1,800– c. 2,400 m
Status: Biosphere Reserve
Potential categories: Globally-threatened species, restricted-range species

Site description

Mt Kulal lies 25 km east of the southern end of Lake Turkana (IBA 28). It is an impressive, isolated volcanic mountain rising abruptly from the semi-desert plain, with a substantial central crater and deep canyons on the eastern side. The mountain is aligned on a north-south axis, with southern and northern blocks that are separated by an impassable narrow, vertical wall of rock.

Montane forest and grassland occur on the mountain top above 2,000 m, where the trees include *Juniperus procera*, *Teclea simplicifolia*, *Olea capensis*, *Cassipourea malosana* and *Diospyros abyssinica* (Diamond & Keith 1980). This gives way to a sub-montane zone (1,800–2,000 m) of dry evergreen forest dominated by *Olea europaea* and *Juniperus procera*, with *Euclea* and *Carissa* in the understorey. This in turn merges into semi-arid woodland and bushland with *Combretum*, *Euphorbia* and *Acacia drepanolobium*.

Birds

The forest avifauna is impoverished but typical of the Afrotropical Highlands biome (Diamond & Keith 1980, L. Borghesio, *in litt.*). Kulal is unusual among Kenya's northern 'island' forests in having an

endemic bird taxon, the Kulal White-eye *Zosterops (poliogaster) kulalensis*. Kulal White-eyes are common in the forest zone, particularly favouring edge habitats (L. Borghesio, unpubl. data). This is recognised as a (globally threatened and restricted-range) species by Collar *et al.* (1994), but as a sub-species of Montane White-eye *Z. poliogaster* by OS-c (1996) and Zimmerman *et al.* (1996). There are suggestions that it may be closer to the Yellow White-eye *Z. senegalensis* that occurs on nearby forest 'islands' such as Mt Nyiru (L. Borghesio, pers. comm.). The status and affinities of this taxon are uncertain and await genetic analysis.

Other wildlife

Greater Kudu *Tragelaphus strepsiceros* are recorded in the forest (Diamond & Keith 1980). African Elephant *Loxodonta africana* may occur in the forest from time to time. The area used to hold a population of Black Rhinoceros *Diceros bicornis* but this is probably locally extinct.

Conservation issues

Mt Kulal and its surroundings are designated as a biosphere reserve, though this has not been accompanied by any tangible conservation actions. The forest is under moderate pressure from livestock grazing that hinders regeneration. Tree-felling (for fuel and construction of houses and livestock enclosures) is potentially a problem. However, moderate levels of disturbance, such as presently exist, are probably beneficial to the Kulal White-eye (L. Borghesio, pers. comm).

Further reading

Diamond & Keith 1980, Ndang'ang'a & Borghesio in press

Scarlet-tufted Malachite Sunbird

5 References

Adel, E. & Gachanja, M.K. 1997. *Report of a baseline survey at Gatamaiyu Forest, 11–12 September 1997.* Unpublished report. Nairobi: Kenya Forests Working Group.

Agnew, A.D.Q. 1985. Cyclic sequences of vegetation in the plant communities of the Aberdares Mountains, Kenya. *J. East Afr. Nat. Hist. Soc. & Natl Mus.* 75, no. 183.

Agnew, A.D.Q. & Agnew, S. 1994. *Upland Kenya wild flowers.* 2nd edition. Nairobi: East Africa Natural History Society.

Allan, I. (ed.) 1981. *Guide to Mount Kenya and Kilimanjaro.* Nairobi: Mountain Club of Kenya.

Allen, P.M. 1975. Ololokwe camp. *EANHS Bulletin* 1975: 4

Ament, J.G. 1975. The vascular plants of Meru National Park, Kenya. Part 1. A preliminary survey of the vegetation. *J. East Afr. Nat. Hist. Soc.* no. 154: 1–10.

Andrews, P., Groves, C. P. & Horne, J.F.M. 1975. The ecology of the Lower Tana River floodplain (Kenya). *J. East Afr. Nat. Hist. Soc.* no. 151: 1–31.

Angwin, D. 1980. Natural history notes from Kakamega Forest, western Kenya. Part 1. *EANHS Bulletin* 1980: 27–34.

Anonymous 1973. *Cheptuy Expedition (LACM) to Boni Forest.* Unpublished mimeo held in the National Museums of Kenya, Ornithology Department.

Backhurst, G. 1996. Ngulia: Kenya's premier migrant ringing site. *Kenya Birds* 4(2): 89–93.

Backhurst, G.C. & Pearson, D.J. 1977a. Southward migration at Ngulia, Tsavo, Kenya 1976/77. *Scopus* 1: 12–17.

Backhurst, G.C. & Pearson, D.J. 1977b. Ethiopian region birds attracted to the lights of Ngulia Safari Lodge, Kenya. *Scopus* 1: 98–103.

Backhurst, G.C. & Pearson, D.J. 1979. Southward migration at Ngulia, Tsavo, Kenya 1978/79. *Scopus* 3: 19–25.

Backhurst, G.C. & Pearson, D.J. 1980. Southward migration at Ngulia, Tsavo, Kenya 1979/80. *Scopus* 4: 14–20.

Backhurst, G.C. & Pearson, D.J. 1981. Ringing and migration at Ngulia, Tsavo, November 1980–January 1981. *Scopus* 5: 28–30.

Backhurst, G.C. & Pearson, D.J. 1983a. Ringing and migration at Ngulia, Tsavo, October to December 1982. *Scopus* 6: 144–145.

Backhurst, G.C. & Pearson, D.J. 1983b. Ringing and migration at Ngulia, Tsavo, autumn 1983. *Scopus* 7: 136–138.

Backhurst, G.C. & Pearson, D.J. 1984. The timing of the southward night migration of Palearctic birds over Ngulia, south-east Kenya. *Proc. Pan-Afr Orn Congr.* 5: 361–369.

Backhurst, G.C., Kelsey, M.G. & Pearson, D.J. 1986. Ringing and migration at Ngulia, Tsavo, autumn 1984. *Scopus* 8: 128–130.

Bally, P.R.O. 1946. Coryndon Museum expedition to the Mau Forest. Part I. Botanist's diary. Part IV. Plants collected on the expedition. *J. East Afr. Nat. Hist. Soc.* 19 (nos. 87 & 88), 81–91, 95–101.

Barnes, J., Barnes, R., Burston, P., Githiru, M., Leckie, J., Mulwa, R. & Pilgrim, J. 1998. *Project Kasigau '98 Preliminary Report.* Unpublished report.

Bax, P.N. 1963. Some preliminary observations on the food of elephant in the Tsavo Royal National Park (East) of Kenya. *E. Africa Wildl. J.* 1: 40–43.

Becha, H. 1997. Stuck in the mud. *Swara* 20(4): 23–25.

Beck, E., Rehder, H., Schulze, E.D. & Kokwaro, J.O. 1987. Alpine plant communities of Mt. Elgon – an altitudinal transect along the Koitoboss Route. *J. East Afr. Nat. Hist. Soc. & Natl Mus.* 76, no. 190: 1–12.

Beentje, H.J. 1987. Additional notes on the vegetation of the Cheranganis and a key to the shrubby ericoid species. *EANHS Bulletin* 17(4): 51–52.

Beentje, H.J. (ed.) 1988. An ecological and floristic study of the Taita hills, Kenya. *Utafiti* 1(2): 23–66.

Beentje, 1990. The forests of Kenya. *Mitt. Inst. Allg. Bot. Hamburg* 23a: 265–286.

Beentje, H. 1994. *Kenya trees, shrubs and lianas.* Nairobi: National Museums of Kenya.

Beentje, H.J., Ndiangui, N. & Mutangah, J. 1987. Forest Islands in the mist. *Swara* 10(1): 20–21.

Bennun, L.A. 1985. The Spotted Ground Thrush *Turdus fischeri fischeri* at Gede in coastal Kenya. *Scopus* 9: 97–107

Bennun, L.A. 1987. Ringing and recapture of Spotted Ground Thrushes *Turdus fischeri fischeri* at Gede, Kenya coast: indications of site fidelity and population size stability. *Scopus* 11(1): 1–5.

Bennun, L.A 1991. An avifaunal survey of the Trans-Mara Forest, Kenya. *Scopus* 14: 61–72.

Bennun, L.A. 1992a. Summary results of the January 1992 waterfowl counts. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 7.

Bennun, L.A. 1992b. Waterbirds at Lake Nakuru, July 1992. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 8.

Bennun, L.A. 1992c. Threatened birds of Kenya 1: Spotted Ground Thrush. *Kenya Birds* 1(1):19–21.

Bennun, L.A. 1993. Waterbirds in the Southern Kenyan Rift Valley, January 1993. *Research report for the Centre for Biodiversity, National Museums of Kenya: Ornithology 13.*

Bennun, L.A. 1994a. Birding in ... Kakamega. *Kenya Birds* 2(2): 19–27.

Bennun, L.A. 1994b. Threatened birds of Kenya. 5. Abbott's Starling. *Kenya Birds* 3(1): 38–39.

Bennun, L.A. 1994c. Threatened birds of Kenya: 6. Grey-crested Helmet Shrike. *Kenya Birds* 3(2): 84–87.

Bennun, L.A. 1995. Arabuko again ... *Swara* 18(5): 22–23.

Bennun, L. & Fasola, M. (eds) 1996. Resident and migrant waterbirds at Lake Turkana, February 1992. *Quaderni della Civica Stazione Idrobiological di Milano* 21: 7–62.

Bennun, L.A & Fishpool, L.D.C. (in press). Important Bird Areas in Africa. *Ostrich.*

Bennun, L.A. & Nasirwa, O. (in press). Trends in waterbird numbers in the southern Rift Valley of Kenya. *Ostrich.*

Bennun, L. & Njoroge, P. (eds) 1996. Birds to watch in East Africa: A preliminary Red Data list. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 23.

Bennun, L.A. & Waiyaki, E.M. 1992a. Using birds to monitor environmental change in the Mau Forests. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 2.

Bennun, L.A. & Waiyaki, E.M. 1992b. An ornithological survey of the Mau Forest Complex. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 3.

Bennun, L.A. & Waiyaki, E.M. 1992c. An ornithological survey of Kakamega Forest. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 4.

Bennun, L.A. & Waiyaki, E.M. 1992d. Bird communities of the Arabuko-Sokoke Forest. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 5.

Bennun, L.A. & Waiyaki, E.M. 1992e. Forest birds of the Shimba Hills and Maluganji: A survey. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology* 10.

Bennun, L., Dranzoa, C. & Pomeroy, D. (in press) The forest birds of Kenya and Uganda. *Journal of East African Natural History.*

Bergmans, W. 1980. A new fruit bat from Shimba Hills. *EANHS Bulletin* 1980: 96.

Betts, F.N. 1966. Notes on some resident breeding birds of southwest Kenya. *Ibis* 108: 513–530.

Birnie, A. 1992. EANHS outing to Mwea National Reserve, Saturday 30 May to Monday 1 June 1992. *EANHS Bulletin* 22(4): 58–59.

Blackett, H.L. 1994a. *Forest inventory report no. 1. South-western Mau and Trans-Mara Forest Reserves.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994b. *Forest inventory report no. 2: Arabuko-Sokoke.* Nairobi: Forest Department /Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994c. *Forest inventory report no. 3: Kakamega.* Nairobi: Forest Department /Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994d. *Forest inventory report no. 4: Shimba Hills, Mkongani North and Mkongani West.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994e. *Forest inventory report no. 5: The Aberdares, Kikuyu Escarpment and Kipipiri.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994f. *Forest inventory report no. 6: Mount Kenya and Thungaru Hill.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994g. *Forest inventory report No. 10: North Nandi, Kaptarol and Taressia.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994h. *Forest inventory report no. 11: South Nandi and Ururu.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994i. *Forest inventory report no. 13: Cheraingani Hills East (Kipkunurr etc.).* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Blackett, H.L. 1994j. *Forest inventory report no. 14: Kapkanyar, Kapolet and Kiptalevr.* Nairobi: Forest Department/Kenya Indigenous Forest Conservation Programme.

Brass, D. 1994. Nests on Kisite Island. *Kenya Birds* 2(2): 38–39.

References

Braunstein, W. 1996. The secret life of Mara Flowers. *Swara* 19(4): 21

Britton, P.L. 1974. The Garsen Heronry on the Tana River. *EANHS Bulletin* 1974: 129–130.

Britton, P.L. 1977. Status and identification of East African terns. *Scopus* 1: 29–34.

Britton, P.L. 1978. Seasonality, density and diversity of birds of a papyrus swamp in western Kenya. *Ibis* 120: 450–466.

Britton, P.L. 1980. Birds of East Africa: Their habitat, status and distribution. EANHS, Nairobi.

Britton, P.L. & Britton, H.A. 1973. Broad billed Sandpiper in Kenya coast. *EANHS Bulletin* November 1973: 146–7.

Britton, P.L. & Brown, L.H. 1971. Breeding sea-birds at the Kiunga Islands, Kenya. *Ibis* 364–366.

Britton, P.L. & Brown, L.H. 1974. The status and breeding behaviour of East Africa Lari. *Ostrich* 45: 63–82.

Britton, P.L. & Sugg, M. St. J., 1973. Birds recorded on the Kimilili track, Mt Elgon, Kenya. *J. EANHS & Natl. Mus.* 143: 1–7.

Britton, P.L. & Zimmerman, D.A. 1979. The Avifauna of Sokoke Forest, Kenya. *J. East Afr. Nat. Hist. Soc. and Natl Mus.* 169: 1–5.

Britton, P.L., Britton, H.A. & Coverdale, M.A.C. 1980. The avifauna of Mrima Hill, South Kenya coast. *Scopus* 4: 73–76.

Brooks, T., Barnes, J., Barnes, R., Kageche, J. & Wilder, C. 1997. Birding in ... the Taita Hills. *Kenya Birds* 5(2): 63–69.

Brooks, T., Lens, L., Barnes, J., Barnes, R., Kihuria J.K., & Wilder, C. (in press a) The conservation status of the forest birds of the Taita Hills, Kenya. *Bird Conservation International.*

Brooks, T., Lens, L., de Meyer, M., Waiyaki, E. & Wilder, C. (in press b) Ornithological research in the Taita Hills. I. Biogeography. *J. E. Afr. Nat. Hist.*

Brown, L. 1973. *The mystery of the flamingos.* Nairobi: East Africa Publishing House.

Brown, L. 1975. *East African coasts and reefs.* Nairobi: East African Publishing House.

Burgis, M.J. & Mavuti, K.M. 1987. The Gregory Rift. Pp. 331–348 in Burgis, M.J. & Symoens, J.J. (eds) *African wetland and shallow water bodies directory.* Paris: IUCN & WWF.

Butynski, T. 1994. Uluguru Violet-backed Sunbirds *Anthreptes neglectus* at Tana, Kenya. *Scopus* 18: 62–64.

Butynski, T. 1995. Report says dam could threaten Kenya's endangered primates. *African Primates* 1(1): 14–17.

Butynski, T. & Mwangi, G. 1995. Census of Kenya's endangered Red Colobus and Crested Mangabey. *African Primates* 1(1): 8–10.

Campbell, L. 1992. Some notes on herbaceous plants from Mwea National Reserve. *EANHS Bulletin* 22(4): 59–60.

Cheffings, J. 1987. The Tana Delta. *Swara* 10(4): 10–11.

Cheke, R. A. 1972. Birds of the Cherangani montane forests and their parasites. *E. Afr. Wildl. J.* 10: 245–249.

Cheke, R.A. 1978. Records of birds and their parasites from the Cherangani mountains, Kenya. *E. Afr. Wildl. J.* 16: 61–64.

Coastal ASAL Development Project 1991. *Tana River Delta Wetlands Survey.* Nairobi: Ministry of Reclamation and Development of Arid and Semi-arid areas and wastelands.

Coe, M.J. 1967. *The ecology of the alpine zone of Mount Kenya.* The Hague: W. Junk.

Coe, M.J. & Foster, J.B. 1972. The mammals of the northern slopes of Mt Kenya. *J. East Afr. Nat. Hist. Soc.* no. 131: 1–18.

Collar, N.J & Stuart, S.N. 1985. *Threatened birds of Africa and related islands.* ICBP/IUCN Red Data Book, Part 1. ICBP/IUCN, Cambridge.

Collar, N.J & Stuart, S.N. 1988. *Key forests for threatened birds in Africa.* ICBP Monograph No. 3. Cambridge: ICBP.

Collar, N.J., Crosby, M.J. & Stattersfield, A.J. 1994. *Birds to watch 2: The world list of threatened birds.* BirdLife Conservation Series No.4. Cambridge: BirdLife International.

Collins, N.M. & Clifton, M.P. 1984. Threatened wildlife of the Taita Hills. *Swara* 7(5): 10–14.

Coverdale, M.A.C., Hancock, J. & Pearson, D.J. 1983. Unusual December–January breeding at the Garsen heronry, Kenya. *Scopus* 7: 49–50.

Crees, J. 1985. Lake Magadi. *EANHS Bulletin* 1982: 48–49.

Cunningham-van Someren, G.R. 1977. *Birds of the Nguruman Range, Kenya. Section of Ornithology Report no. 1.* Nairobi: National Museums of Kenya (cyclostyled).

Cunningham-van Someren, G.R. 1979. Joint National Museum-Wien Museum ecological survey of the North Nandi Forest. *EANHS Bulletin* 1979: 35–40.

Cunningham-van Someren, G.R. 1980. North Nandi expedition. *EANHS Bulletin* 1980: 6–9.

Davey, P. 1982. General report on Lake Turkana – 24 April–6 May 1982. *EANHS Bulletin* 1982: 78–79.

Davidson, N., Davidson, L., Rutter, W. & Webb, M. 1994. Shoebill safari. *Kenya Birds* 4: 35.

Davies, G. 1993a. *Shimba Hills, Mkongani and Maluganji Forests: Biodiversity overview.* Nairobi: KIFCON/NMK.

Davies, G. 1993b. What killed the Bongo in Mau? *EANHS Bulletin* 23(1): 3–6.

Davies, G. 1994. The Shimba Hills. *Swara* 17(3): 25–27.

Davies, G. & Kahumbu, P. 1993. Tana River Primate National Reserve: Primate census, March 1993. *EANHS Bulletin* 23(3): 35–44.

Davies, G. & Vanden Berghe, E. 1994. *Check-list of the mammals of East Africa.* Nairobi: East Africa Natural History Society.

Davies, G., Ochiago, O. & Kwambai, J. 1993. *West Mau, South West Mau and TransMara Forest Reserves Mammal Survey.* Nairobi: KIFCON/National Museums of Kenya.

Dean, P.B. & Trump, E.C. 1983. *The biotic communities and natural regions of Kenya.* Nairobi: Wildlife Planning Unit, Wildlife Conservation and Management Department.

Decker, B.S. 1987. The Tana River National Primate Reserve. *Swara* 10 (4): 13–15.

Diamond, A. & Fayad, V.C. 1979. Preliminary comparisons between the avifaunas of the North Nandi and Kakamega forests. *Scopus* 3: 93–100.

Diamond, A.W. & Fillon, F.L. 1987. *The value of birds.* International Council for Bird Preservation Technical Publication No. 6. Cambridge: ICBP.

Diamond, A.W. & Keith, G.S. 1980. Avifaunas of forest islands. I –Mount Kulal. *Scopus* 4: 49–55.

Donnelly, A.V. 1978. Notes from Watamu, Coastal Kenya. *EANHS Bulletin* 1978: 122–125.

Dougherty, N. 1994. Meru National Park: A true wilderness. *Swara* 17(4): 17–19.

Douglas-Hamilton, I. 1988. *Final report: Identification study for the conservation and sustainable use of the natural resources in the Kenya portion of the Mara-Serengeti ecosystem.* Nairobi: Ian Douglas-Hamilton & Associates.

Drewes, R. 1997. Hot spot for frogs. *Swara* 20(2): 27–30

Dublin, H.T. 1986. *Decline of Mara Woodlands: the role of fire and elephants.* Unpublished PhD thesis, University of British Columbia.

Duff-MacKay, A. 1980. *Amphibia: Conservation status report no. 1.* Nairobi: National Museums of Kenya.

OS-c 1981. East African Bird Report 1980. *Scopus* 4(5): 101–140.

OS-c 1983a. East African Bird Report 1981. *Scopus* 5(5): 129–153.

OS-c 1983b. East African Bird Report 1982. *Scopus* 6(5): 109–152.

OS-c 1984. East African Bird Report 1983. *Scopus* 7(5): 105–148.

OS-c 1996. *Check-list of the birds of Kenya.* Nairobi: East Africa Natural History Society Ornithological Sub-committee.

Ecosystems Ltd. 1985. *Tana Delta ecological impact study. Final report.* Nairobi: Tana and Athi Rivers Development Authority.

Ekkens, D. 1988. Fire and regrowth on Mt Elgon. *Swara* 11(4): 30–31.

Emerton, L. 1994. *Summary of the current value of use of Kakamega Forest.* Nairobi: Kenya Indigenous Forest Conservation Programme.

ERL (Environmental Resources Ltd.) 1990. *Environmental study of the Mau and Trans Mara Forests, Kenya. Reference: OMI. 89/90 485/031/001A.* London: ERL.

Evans, M.I. 1994. *Important Birds Areas in the Middle East.* BirdLife Conservation Series No. 2. Cambridge: BirdLife International.

EWNHS 1996. *Important Bird Areas of Ethiopia: A first inventory.* Addis Ababa: Ethiopian Wildlife and Natural History Society.

Faden, R.B. & Faden, A.J. 1972. *Some common trees of Gede.* Nairobi: National Museums of Kenya.

Fairweather, C. 1993. Mount Kenya: a botanical wonderland. *Swara* 16(3): 25–27.

Fanshawe, J.H. 1991. *Arabuko-Sokoke Forest Project. Second annual report.* Cambridge: International Council for Bird Preservation.

Fanshawe, J.H. 1992. *Third Annual Report of the Arabuko-Sokoke Forest Project from the International Council for Bird Preservation to the EEC (Article B946/89).* Cambridge: International Council for Bird Preservation.

Fanshawe, J.H. 1994. Birding Arabuko-Sokoke Forest and Kenya's northern coast. *Bulletin of the African Bird Club* 1(2): 79–89.

Fanshawe, J.H. 1995. *The effects of selective logging on the bird community of Arabuko-Sokoke forest.* Unpublished PhD thesis, University of Oxford, UK.

Fanshawe, J.H. & Bennun, L.A. 1991. Bird conservation in Kenya: creating a national strategy. *Bird Conservation International* 1: 293–315.

Fasola, M., Biddau, L. & Borghesio, L. 1993a. Habitat preference of resident and Palearctic waterbirds of Lake Turkana. *Proc. VIII Pan Afr. Orn. Congr.* 539–545.

Fasola, M., Biddau, L., Borghesio, L., Baccetti, N. & Spina, F. 1993b. Waterbird populations at Lake Turkana, February 1992. *Proc. VIII Pan Afr. Orn. Congr.* 529–532.

Finch, B.W. 1989. Blue Swallows *Hirundo atrocaerulea* near Busia: the second record for Kenya. *Scopus* 13: 125–126.

Finch, B.W. 1994. Birding in and around the Masai Mara. *Kenya Birds* 3(2): 57–66.

Finch, B.W. n.d. *Birds of the Masai Mara checklist*. Nairobi: Friends of Conservation.

Finch, B., Pearson, D.J. & Lewis, A.D. 1989. *Birds of Samburu, Buffalo Springs and Shaba National Reserves Checklist*. Nairobi: Friends of Conservation.

Fishpool, L. 1996. Important Bird Areas in Africa. IBA criteria categories and thresholds. Cambridge: BirdLife International.

FitzGibbon, C.D & Fanshawe, J.H. 1992. *The influence of subsistence hunting on the fauna of Arabuko Sokoke Forest*. Nairobi: KIFCON.

FitzGibbon, C.D. 1994. The distribution and abundance of the Golden-rumped Elephant-shrew *Rhynchocyon chrysopygus* in Kenyan coastal forests. *Biological Conservation* 67: 153–160.

FitzGibbon, C.D., Mogaka, H. & Fanshawe, J.H. 1995. Subsistence hunting in Arabuko-Sokoke Forest, Kenya, and its effects on populations of mammalian prey. *Conservation Biology* 9: 1–12.

Fogden, M.P.L. 1964. The reproductive behaviour and taxonomy of Hemprich's Gull *Larus hemprichi*. *Ibis* 106: 299–320.

Forest Department 1992. *Kilifi District Forestry Master Plan*. Nairobi: FINNIDA/Forest Department.

Gachanja, M. 1997. The East African Wildlife Society's Taita Hills Project. *Kenya Birds* 5(2): 93–95.

Gakahu, C.G. (ed) 1992. *Tourist attitudes and use impacts in Maasai Mara National Reserve*. Proceedings of a workshop organised by Wildlife Conservation International at Masai Mara N. R., March 1991. Nairobi: Wildlife Conservation International.

Gang, P.O. & Agatswa, J.L. 1992. The current status of mangroves along the Kenyan Coast: A case study of the Mida Creek mangroves based on remote sensing. Pp. 29–36 in Jaccarini, V. & Martens, E (eds) *Developments in hydrobiology: the ecology of mangroves and related ecosystems*. Dordrecht: Kluwer Academic Publishers.

Gardner, N. Birding in Kieni Forest. *Bulletin of the African Bird Club* 3(1): 51–52.

Gaudet, J.J. 1977. Natural drawdown on Lake Naivasha (Kenya) and the formation of papyrus swamps. *Aquatic Botany* 3: 1–47.

Gerhardt, K & Steiner, M. 1986. *An inventory of a coastal forest in Kenya at Gedi National Monument including a check-list and a Nature Trail*. Swedish University of Agricultural Sciences. International Rural Development Centre. Working Paper 36. Uppsala: Sveriges Lantbruksuniversiteit.

Gitogo, G.M. 1993. *The effect of rehabilitation of* Acacia *bushlands on bird communities in Baringo District, Kenya*. Unpublished MPhil thesis, Moi University, Eldoret, Kenya.

Glover, P.E. 1969. *A report on an ecological survey of the proposed Shimba Hills National Reserve*. Nairobi: Soil Survey Unit, Department of Agriculture.

GoK 1968. *A forest policy for Kenya. Sessional paper no. 1 of 1968*. Nairobi: Government Printer.

Grimmett, R.F.A. & Jones, T.A. 1989. *Important Bird Areas in Europe*. ICBP Technical Publication No. 9. Cambridge: ICBP.

Hancock, N.J. 1971. The Cherangani Hills, Kenya. *Bulletin of the Oxford University Exploration Club*. 18: 55–86.

Hardy, I. 1979. Golden Cat in the Aberdare National Park. *EANHS Bulletin* 1979: 111–112.

Harper, D.M. 1984. Recent changes in the ecology of Lake Naivasha, Kenya. *Verhandlungen Internationale Vereinigung Limnologie* 22: 1193–1197.

Harper, D.M. (ed) 1987. *Studies on the Lake Naivasha ecosystem 1982–4*. Leicester: Leicester University Zoology Department.

Harper, D.M. 1992. The ecological relationships of aquatic plants at Lake Naivasha, Kenya. *Hydrobiologia* 232: 65–71.

Harper, D.M. & Mavuti, K.M. 1996. Freshwater wetlands and marshes. In McClanahan, T. & Young, T. (eds) *East African ecosystems and their conservation*. New York: Oxford University Press.

Harper, D.M., Mavuti, K.M. & Muchiri, S.M. 1990. Ecology and management of Lake Naivasha, Kenya, in relation to climate change, alien species introductions and agricultural development. *Environmental Conservation* 17: 328–335.

Harper, D.M., Phillips, G., Chilvers, A., Kitaka, N. & Mavuti, K.M. 1993. Eutrophication prognosis for Lake Naivasha. *Verhandlungen Internationale Vereinigung Limnologie* 25: 861–865.

Harper, D.M., Adams, C. & Mavuti, K.M. 1995. The aquatic plant communities of the Lake Naivasha wetland, Kenya: pattern, dynamics and conservation. *Wetlands Ecology & Management* 3: 111–123.

Hartley, J. 1986. *A guide to lakes Baringo and Bogoria*. Nairobi: Evans Brothers (Kenya) Ltd, Nairobi.

Harvey, B. 1997. *Annotated checklist of the birds of Nairobi, including Nairobi National Park*. Nairobi: British Council.

Henderson, I.G. & Harper, D.M. 1992. Bird distribution and habitat structure on Lake Naivasha, Kenya. *Afr. J. Ecol.* 30: 223–232.

Higgins, S. 1994. Fish Eagle chicks feast on coots. *Kenya Birds* 2(2): 39–40.

Hockey, P.A.R., Plaganyi, E. E., Turpie, J. K. & Phillips, T. E. 1996. Foraging behaviour of Crab Plovers *Dromas ardeola* at Mida Creek, Kenya. *Ostrich* 67: 33–44.

Hoefsloot, H. & Onyango, G. 1995. Mount Elgon National Park. *Swara* 18(5): 33–35.

Hopson, A.J. (ed) 1982. Lake Turkana: a report of the findings of the lake Turkana project 1972–75 (six volumes). London: Overseas Development Administration.

Howard, G.W. & Bennun, L.A. (eds) 1993. *Research and monitoring for Lake Nakuru National Park and catchment. Report of a KWS/KIWWG/WWF planning workshop, Nakuru, 29–30 May 1993*. Nairobi: Kenya Wetlands Working Group.

Howard, P.C., Viskanic, P., Davenport, T.R.B., Kigenyi, F.W., Baltzer, M., Dickinson, C.J., Lwanga, J.S., Matthews, R.A. & Balmford, A. 1998. Complementarity and the use of indicator groups for reserve selection in Uganda. *Nature* 394: 472–475.

Hughes, F. 1982. On the Lower Tana. *Swara* 5(4): 22–25.

Hughes, F.M. 1987. Conflicting uses for forest resources in the lower Tana River basin of Kenya. Pp. 211–228 in Anderson, D. & Grove, R. (eds) *Conservation in action*. Cambridge: Cambridge University Press.

Hughes, F.M. 1990. The influence of flooding regimes on forest distribution and composition in the Tana River floodplain. *Journal of Applied Ecology* 27: 475–491.

Hughes, R.H. & Hughes, J.S. 1992. *A directory of African wetlands*. Gland, Cambridge and Nairobi: IUCN/UNEP/WCMC.

ICBP 1992. *Putting biodiversity on the map: priority areas for global distribution*. Cambridge: ICBP.

Irvine, G.C. & Irvine, D. 1970. Diani Forest – October 1970. *EANHS Newsletter* 1970: 42–43.

Irvine, G.C. & Irvine, D. 1977a. Down at Diani – October 1976. EANHS Bulletin 1977: 85–86.

Irvine, G.C. & Irvine, D. 1977b. Notes on birds seen in Diani Forest, Kenya. EANHS Bulletin 1977: 106–108.

Irvine, G. & Irvine, D. 1988. Down at Diani – October 1987. *EANHS Bulletin* 18(1): 10–11.

Irvine, G. & Irvine, D. 1991. Notes from Diani – September 1990. *EANHS Bulletin* 21(1): 12–13.

IUCN 1996. *Forest cover and forest resources in Kenya: Policy and practice*. Nairobi: IUCN Eastern Africa Regional Office.

IUCN/UNEP, 1987. IUCN Directory of Afrotropical Protected Areas, IUCN, Gland Switzerland and Cambridge UK

Jackson, A.J.H. & McCarter, 1994. *A profile of the Mau Forest Complex*. Nairobi: KIFCON.

Jensen, C.L. & Belsky, A.J. 1989. Grassland homogeneity in Tsavo National Park (West), Kenya. *Afr. J. Ecol.* 27(1): 35–44.

Johnstone, F. & Githongo, J. 1997. Killer weed. *Swara* 20(4): 28–29.

Jones, D. K. 1982. The Masai Mara National Reserve. *Swara* 5(6): 13–15.

Juma, C. 1989. *Biological diversity and innovation: Conserving and utilising genetic resources in Kenya*. Nairobi: African Centre for Technology Studies.

Kahindi, O. 1994. Eavesdropping: Shoebill in the Masai Mara. *Kenya Birds* 3(2): 78–79.

Kahindi, O. & McIlvaine, K. (eds) 1993. *Waste management and energy conservation: a guide for lodge and camp management in wildlife areas*. Nairobi: Friends of Conservation.

Kahumbu, P. 1993. Threats to *Ficus sycomorus* in the Tana River Primate National Reserve. *EANHS Bulletin* 23(3): 46–49.

Kahumbu, P. & Eley, R. 1997. Diani's front-line colobus. *Safari* 7(6): 6–14.

Kanga, E. 1996. *Survey of Ader's Duiker Cephalophus adersi and other ungulates in the Arabuko-Sokoke Forest Reserve, Kenya*. Unpublished report to National Museums of Kenya and Zoo Atlanta.

Kelsey, M.G. & Langton, T.E.S. 1984. *The conservation of Arabuko Sokoke Forest*. ICBP Study Report no. 4. Cambridge: International Council for Bird Preservation.

Kent, J.B. 1994. Shoebill *Balaeniceps rex* at Amboseli National Park, Kenya. *Kenya Birds* 4: 34.

Kerfoot, O. 1964. The vegetation of the Southwest Mau forest. *E. Afr. Agric. For. J.* 29: 295–318.

KIFCON 1992. *Workshop on information requirements and planning relating to Mount Kenya*. Nairobi: Kenya Indigenous Forest Conservation

References

Programme.

Kigomo, B. N. 1987. Some observations on regeneration trials in the Kakamega and South Nandi forests, Kenya. *E. Afri. Agric. For. J.* 52(3): 184–195.

Kirkman, J. 1975. *Gedi Historical Monument* (8th edition). Nairobi: National Museums of Kenya.

Kiss, A. 1993. The Global Environmental Facility and the Project for Conservation of the Tana River Primate National Reserve. *EANHS Bulletin* 23(3): 34.

Kokwaro, J.O. 1988. Conservation status of the Kakamega Forest in Kenya: the easternmost relict of the equatorial rain forests of Africa. *Monographs of Systematic Botany of the Missouri Botanic Gardens* 25: 471–489.

Kokwaro, J.O. & Beck, E. 1987. The animal threat to Mount Kenya's Afro-alpine plants. *Swara* 10(1): 30–31.

Kosgey, D.K. 1998. *Status and habitat choice of Turner's Eremomela,* Eremomela turneri *(Van Someren 1920) in South Nandi Forest Reserve, Kenya.* Unpublished MPhil thesis, Moi University.

Koyo, A. 1994. Marine Parks and reserves. *Swara* 17(3): 14–15.

Lack, P.C. 1977. The status of Friedmann's Bush-lark *Mirafra pulpa*. *Scopus* 1: 34–39.

Lack, P.C. 1983a. *The habitats and feeding stations of the landbirds of Tsavo East National Park, Kenya.* Unpublished D.Phil. thesis, University of Oxford.

Lack, P.C. 1983b. The movements of Palearctic landbird migrants in Tsavo East National Park, Kenya. *J. Anim. Ecol.* 52: 513–524.

Lack, P.C. 1985. The ecology of the land-birds of Tsavo East National Park, Kenya. *Scopus* 9: 2–23, 57–96.

Lack, P.C., Leuthold, W. & Smeenk C. 1980. Checklist of the birds of Tsavo East National Park, Kenya. *J. East Afr. Nat. Hist. Soc. & Natl Mus.* 170: 1–25.

Larsen, T. 1991. *The butterflies of Kenya and their natural history.* Oxford: Oxford University Press.

Lawton, J.H., Bignell, D.E., Bolton, B., Bloemers, G.F., Eggleton, P., Hammond, P.M., Hodda, M., Holt, R.D., Larsen, T.B., Mawdsley, N.A., Stork, N.E., Srivastave, D.S. & Watt, A.D. 1998. Biodiversity inventories, indicator taxa and effects of habitat modification in tropical forest. *Nature* 391: 72–76.

Le Pelley, P. 1992. Mwea National Reserve – 29 May–1 June 1992. *EANHS Bulletin* 22(4): 57–58.

Lens, L. 1995. Grassland birds prefer grass. *Kenya Birds* 4:1.

Lens, L. & de Meyer, M. (in press) The Taita Hills project, a study on biodiversity and habitat fragmentation. *J. E. Afr. Nat. Hist.*.

Lens, L., Muchai, M., Bennun, L. & Duchateau, L. (in press, a). How grassland fragmentation and change in land-use affect Sharpe's Longclaw, *Macronyx sharpei*, a Kenya highland endemic. *Ostrich*.

Lens, L., Duchateau, L. & Bennun, L.A. (in press, b) Patch size affects population densities of Sharpe's Longclaw, a Kenyan grassland endemic. *Oecologia*.

Leuthold, W. & Leuthold, B.M. 1976. Density and biomass of ungulates in Tsavo East National Park, Kenya. *E. Afr. Wildl. J.* 14: 49–58.

Lewis, A. 1983. A record of Grey-crested Helmet Shrike near Naivasha, Kenya. *Scopus* 7: 26–27.

Lewis, A & Pomeroy, D 1989. *A Bird Atlas of Kenya.* Rotterdam: A.A. Balkema Publishers.

Lincer, K.F., Zalkind, D. Brown, L.H. & Hopcraft, J. Organochloride residues in Kenya's Rift Valley lakes. *J. Appl. Ecol.* 18: 157–171

Lindsay, N. 1994. A place of contrasts. *Swara* 17(2): 28–30.

Lockwood, L. 1995. Mount Kenya under threat. *Swara* 18(5): 18–21.

Loefler, I. 1987. The strangulation of a sanctuary. *Swara* 10(1): 6–7.

Loefler, I. 1989. Mwea National Reserve. *Swara* 12(3): 8–10.

Lubanga, M. 1992. *Use of the forest by households living adjacent to Mt. Kenya forest.* Nairobi: KIFCON.

Luke, Q., (in press.) Elephant, the Kayas and plant diversity of the Shimba Hills. In: *Proceedings of the workshop on integrated management of the Shimba Hills.* Nairobi: Kenya Wildlife Service.

Mabberley, D. J. 1975. Notes on the vegetation of the Cherangani Hills, North Western Kenya. *J. E. Afr. Nat. Hist. Soc. & Natl Mus.*, no. 150: 1–11.

Macharia, J.K. 1997. The revised forest policy and legislation: The vision and focus on future forest developments in Kenya. Pp. 1–6 in Bekuta, B.K. & Schulze, R. (eds) *The status of forest research and management in Kenya.* Proceedings of a joint KEFRI-FD National Conference. Muguga, Kenya: Kenya Forestry Research Institute.

Malcolm-Coe, Y. 1994. Birding in Kieni and Gatamayu Forests. *Kenya Birds* 3(1): 11–14.

Mann, C. F. 1973. Some recent raptor records from East Africa *EANHS Bulletin* 1973: 96–98.

Mann, C.F 1976. Some recent changes in our understanding of bird distributions in East Africa.

J. E. Afr. Nat. Hist. Soc. & Natl Mus. 157: 1–24.

Mann, C. F. 1980. Notes on the avifauna of Kakamega and Nandi Forests. *Scopus* 4: 97–99.

Mann, C.F. 1985. An avifaunal study in Kakamega Forest, Kenya, with particular reference to species diversity, weight and moult. *Ostrich* 56: 236–262.

Marsh, C. 1986. A re-survey of the Tana River primates and their forest habitat. *Primate Conservation* 7: 72–81.

Marsh, C., Nichols, S. & Parker, D. 1975. *Birds of Tana River Primate Game Reserve: species abundance and habitat preferences.* Unpubl. MS. kept by East Africa Natural History Society, Nairobi.

Martyn, N. 1995. The Naikarra Wild Dogs. *EANHS Bulletin* 63–64.

Matiku, P.M, Bennun, L.A & Nemeth, E. (in press). Distribution and population size of the East Coast Akalat in Arabuko-Sokoke Forest, Kenya. *Ostrich.*

Mavuti, K.M. 1992. An account of some important freshwater wetlands of Kenya. Pp. 23–35 in Crafter, S.A., Njuguna S.G. & Howard, G.W. (eds) *Wetlands of Kenya. Proceedings of the KWWG seminar on wetlands of Kenya,* NMK, Nairobi, Kenya, 3–5 July 1991. Gland: IUCN.

Mburugu, J. 1974. Disappearance of Flamingoes and Blue-Green Algae from Lake Nakuru in 1974.

Medley, K.M. 1990. *Forest ecology and conservation in the Tana River National Primate Reserve, Kenya.* PhD dissertation, Michigan State University, East Lansing, USA

Medley, K. 1993. Mchambia (*Pachisteln msolo*), an indicator of forest condition in the Tana River. *EANHS Bulletin* 23(3): 44–46.

Medley, K.E. 1995. Forest regeneration in the Tana River Primate National Reserve, Kenya. *J. East Afr. Nat. Hist.* 84: 77–96.

Medley, K.E., Kinnaird, M.F. & Decker, B.S. 1989. A survey of the riverine forests in the Wema/Hewani vicinity, with reference to development and the preservation of endemic primates and human resources. *Utafiti* 2: 1–6.

Milner, J., Litoroh, M. & Gathua, M. 1993. *Mammals of Mount Kenya and its forests: A preliminary survey.* KIFCON, Nairobi.

Mlingwa, C.O.F., Waiyaki, E.M., Bennun, L.A. & Burgess, N.D. (in press). Birds. In N.D. Burgess & G.P. Clarke (eds) *Coastal forests in eastern Africa: biodiversity and conservation.* IUCN, Gland, Switzerland.

Mogaka, C.F. 1991. *Local utilization of Arabuko-Sokoke Forest Reserve.* Nairobi: KIFCON.

Mondolfi, E. & Mondolfi, R. 1993. Less common antelopes found in Nairobi National Park. *Swara* 16(1): 24–27.

Moore, R. D. 1982. Where to watch birds in Kenya. *Nairobi: Transafrica Press.*

Muchai, S.M. 1997. *Some aspects of the conservation biology of Sharpe's Longclaw* (Macronyx sharpei), *a Kenyan grassland endemic bird.* Unpublished MPhil thesis, Moi University, Eldoret, Kenya.

Mungai, G. 1985. Comment. *Swara* 8(6): 7.

Mutangah, J. G. 1994. The vegetation of Lake Nakuru National Park, Kenya. A synopsis of the vegetation types with annotated species list. *J. E. Afr. Nat. Hist. Soc. & Natl Mus.* 83(1): 71.

Mutangah, J.G. & Mwaura, P.K. 1992. *Kakamega: A vegetation survey report.* Nairobi: KIFCON/National Museums of Kenya.

Mutangah, J.G., Mwangangi, O.M. & Mwaura, P.K. 1993. *Mau Forest Complex vegetation survey.* Nairobi: KIFCON/National Museums of Kenya.

Myers, N. 1974. The ecological/socio-economic interface of wildlife conservation in emergent Africa: Lake Nakuru and Lake Naivasha in Kenya. *Journal of Environmental Economics and Management* 1: 319–334.

Nasirwa, O. & Bennun, L.A. 1994. Waterbird counts in Kenya, July 1993 and January 1994. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology,* 17.

Nasirwa, O. & Bennun, L.A. 1995. Monitoring of waterbirds in Central Kenya, July 1994 and January 1995. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology,* 19.

Nasirwa, O. & Njoroge, P. 1996. Status of Blue Swallow *Hirundo atrocaerula* sites in Busia and Suba Districts, Kenya. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology,* 26.

Nasirwa, O. & Njoroge, P. 1997. Papyrus-endemic birds in the fringing swamps of Lake Victoria, Western Kenya. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology,* 28.

Nasirwa, O., Jackson, C. & Gichuki, P. 1995a. Waterbirds on the Upper Tana River Dams. *Kenya Birds* 4(1): 13.

Nasirwa, O., Oyugi, J., Jackson, C., Lens, L., Bennun, L. & Seys, J. 1995b. Surveys of waterbirds in Kenya, 1995: Lake Victoria wetlands, south Kenya coast and Tana River dams. *Research Reports of the Centre for Biodiversity, National*

Museums of Kenya: Ornithology, 20: 1–22.

Nasirwa, O., Njoroge, P. & van Helvoort, B. 1998. A survey of waterbirds on the north Kenya coast. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology*, 31.

National Biodiversity Unit 1991. *The cost of biodiversity conservation in Kenya*. UNEP Kenya Biodiversity Country Study. Nairobi: UNEP.

NBU 1992. *The costs, benefits and unmet needs of biological diversity conservation in Kenya. A study prepared for the Government of Kenya and the United Nations Environment Programme*. Nairobi: National Biodiversity Unit.

Ndang'ang'a, K. & Borghesio, L. (in press) Birding in northern Kenya. *Kenya Birds* 7.

NEAP 1994. *The Kenya National Environment Action Plan (NEAP) Report*. Nairobi: Ministry of Environment and Natural Resources.

Nemeth, E. 1996. Distribution, habitat selection and behaviour of the East Coast Akalat *Sheppardia gunningi*. Report for project no. 5443 for the National Bank of Austria. Vienna: Konrad Lorenz Institute.

Ng'weno, F. 1980. Some observations of birds in the Jadini Forest. *EANHS Bulletin* 1980: 81–82.

Ng'weno, F. 1993. Tana River 1992: a personal journey. *EANHS Bulletin* 23(3): 54–57.

Nicoll, M & Rathbun, G. 1990. *African Insectivora and Elephant-shrews: An action plan for their conservation*. Gland: IUCN.

Njau-ini, M. 1996. Mwea National Reserve and its environs: Current and future strategies. In: *Proceedings of the Workshop on Integrated Planning for a Five-year Management Plan for Mwea National Reserve and its Environs*. Nairobi: Kenya Wildlife Service.

Njoroge, P. 1994. *Some aspects of the conservation biology of Hinde's Babbler*. Unpublished MPhil. thesis. Moi University, Eldoret, Kenya.

Njoroge, P. & Bennun, L. (in press). Status and conservation of Hinde's Babbler *Turdoides hindei*, a threatened species in an agricultural landscape. *Ostrich* (suppl.)

Njoroge, P. & Mutinda, D. 1996. Notes on nesting of Hinde's Babbler *Turdoides hindei* and Northern Pied Babbler *T. hypoleucus* in Kenya. *Ostrich* 67: 170–172

Njoroge, P., Bennun, L.A. & Lens, L. (in press) Habitat use by the globally endangered Hinde's Babbler *Turdoides hindei* and its sympatric relative, the Northern Pied Babbler *T. hypoleucus*. *Bird Conservation International*.

Njue, A. 1992. *The Tana River floodplain forest, Kenya. Hydrologic and edaphic factors as determinants of vegetation structure and function*. PhD dissertation, University of California, Davis, USA.

Njuguna, P.K. 1996. *Some aspects of limnology of Lake Bogoria and their influence on Lesser Flamingo* Phoeniconaias minor *spatial distribution pattern*. Unpublished MPhil thesis, Moi University, Eldoret, Kenya.

Njuguna, S.G. 1982. Naivasha Lakes. *Swara* 4 (3): 8–12.

Njuguna, S.G. 1992. Tana River Delta wetlands. Pp. 139–146 in Crafter, S.A., Njuguna S.G. & Howard, G.W. (eds) *Wetlands of Kenya. Proceedings of the KWWG seminar on wetlands of Kenya*, NMK, Nairobi, Kenya, 3–5 July 1991. Gland: IUCN

Njuguna, S. 1993. Tana Delta: update. *EANHS Bulletin* 23(3): 49–51.

Nkako, F. M. 1992. *Potential human impacts on the proposed Tana Delta wetland reserve with emphasis on landuse patterns as major determinants of boundaries on the proposed Tana Delta Wetland National Reserve*. Nairobi: Kenya Wildlife Service.

North, M.E.W. 1959. The great heronry of Garsen on the River Tana. *J. East Afr. Nat. Hist. Soc.* 23(4) no. 101: 159–160.

NRI 1996. *Kenya renewable natural resources profile*. Chatham, UK: Natural Resources Institute.

Okwaro, P. 1996. Wild jewel: Amboseli's habitats and their wildlife. *Swara* 19(2): 24–26.

Opala, K. 1993. National Park or farm for prawns? *Swara*16(2): 12–13.

Opala, K. 1996. Whose heritage is it? *Swara* 19(4): 14–16.

Otieno, A.K. & Rowntree, K.M. 1986. *A comparative study of land degradation in Machakos and Baringo districts, Kenya*. Report to Baringo Fuel and Fodder Project. Kampi ya Samaki: BFFP.

Oyugi, J. 1994. Lesser Flamingo hit by mystery disease. *Kenya Birds* 2(2): 5–6.

Oyugi, J.O. 1996. Kakamega Forest is dying. *EANHS Bulletin* 26(3/4): 47–49.

Oyugi, W., Kyalo, F. & Turner, D. 1993. *Check-list of birds of Lake Elmenteita. Recorded March 92 – August 93*. Elmenteita: Soysambu Wildlife Sanctuary.

Pearson, D. 1996. Migrant birds at Ngulia. *Kenya Birds* 4(2): 93–96.

Pearson, D.J. 1997. Genus *Acrocephalus* Naumann. Pp. 98–122 in Urban, E.K., Fry, C.H. & Keith, S. *The birds of Africa. Volume V*. London: Academic

Press.

Pearson, D.J. & Backhurst, G.C. 1976. The southward migration of Palearctic birds over Ngulia, Kenya. *Ibis* 118: 78–105.

Pearson, D.J., Britton, P.L. & Britton, H.A. 1978. Substantial wintering populations of the Basra Reed Warbler *Acrocephalus griseldis* in eastern Kenya. *Scopus* 2: 33–35.

Pearson, D.J., Rodwell, S. & Turner, D. 1992. Friedmann's Lark resurfaces in Tsavo. *Kenya Birds* 1(20: 43–44.

Pilgrim, J. (in press) Project Kasigau '98: some preliminary results. *Kenya Birds* 7.

Plumb, W.J. 1979. Observation on Hilde's Babbler *Turdoides hindei*. Scopus 3: 61–67.

Rathbun, G.B. 1978. The African Pitta at Gedi Ruins, Kenya. *Scopus* 2: 7–10.

Rathbun, G.B. 1979a. The social structure and ecology of elephant-shrews. *Adv. Ethol.*, 20.

Rathbun, G.B. 1979b. *Rhynchocyon chrysopygus*. *Mammalian Species* 117: 1–4.

Rehder, H., Beck, E. Kokwaro, J.O., Scheibe, R. 1981. Vegetation analysis of the Upper Ieleki Valley (Mount Kenya) and adjacent areas. *J. East Afr. Nat. Hist. Soc. & Natl Mus.* no. 171.

Reuling, M., Lotoroh, M. & Sakwa, J. 1992. *A survey of the Mau Forest Complex elephant and large mammal population*. Nairobi: KIFCON.

Richards, D. 1991. Pelicans of Lake Nakuru. *Swara* 14(6): 19–21.

Richards, D. 1996. Birding in Tsavo West National Park. *Kenya Birds* 4(2): 65–67.

Richards, D. (in press). Birding in ... Samburu, Buffalo Springs and Shaba. *Kenya Birds* 6: 29–35.

Robertson, A. 1994. *Gede Koningschool Forest Project Final Report, January 1992 to December 1993*. Unpublished report, National Museums of Kenya.

Robertson, S.A. & Luke, W.R.Q. 1993. *Kenya coastal forests. The report of the NMK/WWF coast forest survey*. Nairobi: World Wide Fund for Nature.

Robertson, A. & Ngonyo, M. 1998. *Gede NM Forest Restoration Project Final Report, January 1994 to December 1996*. Unpublished report, National Museums of Kenya.

Rose, K. 1981. *Shimba Hills Reserve Landuse Study, final report: vegetation and landuse changes in the Shimba Hills and its significance to the ecology of large herbivores*. Nairobi: Ecosystems Ltd.

Rose, P.M. & Scott, D.A. 1994. *Waterfowl Population Estimates*. IWRB Special Publication 29. Slimbridge: International Waterfowl and Wetlands Research Bureau.

Rose, P.M. & Scott, D.A. 1997. *Waterfowl Population Estimates. Second edition*. Wetlands International Publication 44. Wageningen: Wetlands International.

Round-Turner, D. 1996. Nairobi Zoo? *Swara* 19(6)&20(1): 12–13.

Rowell, T. 1992. Kakamega Forest. *Swara* 5(2):

Savalli, U.M. 1989. *Checklist of the birds of Kakamega forest and National Reserve*. Nairobi: privately published.

Savalli, U.M. 1991. New birds from Kakamega, Western Kenya, including new breeding records. *Scopus* 15: 35–41.

Schekkerman, H. & Van Wetten, J.C.J. 1987. *An ornithological winter survey of Lake Turkana, Kenya*. WIWO-Report no. 17. Zeist, Netherlands: Dutch Working Group on International Wader and Waterfowl Research.

Schmidt, R. 1991. *Ecology of a tropical lowland rain forest. Plant communities, soil characteristics and nutrient relations of the forests in the Shimba Hills National Reserve, Kenya*. Dissertationes Botanicae 179. Berlin & Stuttgart: J. Cramer.

Scott, J. 1992. Kingdom of lions. *Swara* 15(5): 16–21.

Seal, U.S., Lacy, R.C., Medley, K., Seal, R. & Foose, T.J. 1991. *Tana River Primate Reserve Conservation Assessment Workshop, 26–29 October. Workshop Report*. Nairobi: IUCN Captive Breeding Specialist Group.

Sessions, P.H.B. 1966. Notes on the birds of Lengetia Farm, Mau Narok. *J. East Afr. Nat. Hist. Soc.* 19: 93–94.

Seys, J., Moragwa, G., Boera, P. & Ngoa, M. 1995. Distribution and abundance of birds in tidal creeks and estuaries of the Kenyan coast between Sabaki River and Gazi bay. *Scopus* 19(1): 47–60.

Shah, N. & Upadhyaya, D. 1995. Clean up on Mount Kenya. *Swara* 18(4): 11–12.

Shorter, C. 1982. Amboseli. *Swara* 5 (4): 15–17.

Simiyu, A.M. & Bennun, L.A. (in press) Gamebird hunting in Kenya: developing local management models. *Ostrich*.

Smalley, T.M.E. 1983. A major Lesser Kestrel *Falco naumanni* roost in Kenya. *Scopus* 7: 44–47.

Smeenk, C. 1974. Comparative–ecological studies of some East African birds of prey. *Ardea* 62: 1–97.

Smith, D.L. 1996. Amboseli – another miracle? *Swara* 19(2): 18–21.

Spawls, S. 1978. A checklist of the snakes of Kenya. *J.*

East Afr. Nat. Hist. Soc., vol 31, no. 167.

Stattersfield, A.J., Crosby, M.J., Long, A.J. & Wege, D.C. 1998. *Endemic bird areas of the world: priorities for biodiversity conservation.* BirdLife Conservation Series no. 7. Cambridge: BirdLife International.

Stevenson, T. 1980. *The birds of Lake Baringo.* Nairobi: Block Hotels.

Stuart, S.N., Jensen, F.P., Brogger-Jensen, S. & Miller, R.I. 1993. The zoogeography of the montane forest avifauna of eastern Tanzania. Pp. 203–228 *in* Lovett, J.C. & Wasser, S.K. *Biogeography and ecology of the rain forests of eastern Africa.* Cambridge: Cambridge University Press.

Survey of Kenya 1984. Kenya 1:50,000 Vegetation and Present Land Use Maps, IICA edition. Nairobi: Survey of Kenya.

Tarras-Wahlberg, N. 1986. Observations on *Salvinia* and its environment at Lake Naivasha, Kenya. *J. East Afr. Nat. Hist. Soc & Natl. Mus. 76*: 1–8.

Taylor, P.B 1984. Recent records of Clarke's weaver *Ploceus golandi* and an indication of its breeding season. *Scopus* 8: 28–29.

Taylor, P.B. & Taylor, C.A. 1988. The status, movements and breeding of some birds in the Kikuyu escarpment forest, central Kenya highlands. *Tauraco* 1(1): 72–89.

Tennant, S.R.M. 1965. Notes on the birds of Kakamega Forest. *J. East Afr. Nat. Hist. Soc & Natl. Mus.* 25: 95–100.

Tetlows, S. (ed) 1987. *Cambridge conservation study. 1985; Taita Hills, Kenya.* ICBP. Study Report No. 19. Cambridge: ICBP.

Thomsett, S. (in press) The birds of prey of Ololokwi. *Kenya Birds* 6(1)

Toschi, A. 1946. Coryndon Museum expedition to the Mau Forest. Part III. Birds collected on the expedition. *J. East Afr. Nat. Hist. Soc.* 19 (nos. 87 & 88), 93–94..

Tucker, G.M. & Heath, M. F. 1994. *Birds in Europe: their conservation status.* BirdLife Conservation Series No. 2. Cambridge: BirdLife International.

Tuite, C.H. 1979. Population size, distribution and biomass density of the Lesser Flamingo in the Eastern Rift Valley. *J. Appl. Ecol.* 16:765–775.

Tuite, C.H. 1981. Standing crop densities and distribution of spirulina and benthic diatoms in East African alkaline saline lakes. *Freshwater Biology* 11: 345–360

Turner, A. & Rose, C. 1989. *A handbook to the swallows and martins of the world.* London: Christopher Helm.

Turner, D.A 1977. Status and distribution of East African endemic species. *Scopus* 1: 2–11.

Turner, D.A. 1992. Threatened birds of Kenya. 2: Hinde's Babbler. *Kenya Birds* 1(2): 46–47.

Turner, D.A. (in press) Threatened birds of Kenya 10: Williams's Lark. *Kenya Birds* 6.

Tuya, S. 1996. Let the Maasai keep the Mara. *Swara* 19(4): 7.

Tyler, S.J. 1991. Birds of Lake Naivasha 2. Foraging niches and relationships between migrant and resident warblers in Papyrus swamp. *Scopus* 14(2): 117–128.

UNDP 1994. *Human Development Report.* New York: United Nations Development Programme: Oxford University Press.

van Someren, V.G.L. 1939. Coryndon Memorial Museum Expedition to the Chyulu Hills, April–July, 1938. *J. East Afr. & Uganda Nat. Hist. Soc.* vol 14, nos. 1–2 (62–63): 1–151.

Vareschi, E. 1978. The ecology of Lake Nakuru (Kenya). I. Abundance and feeding of the Lesser Flamingo. *Oecologia* 32: 11–35.

Vareschi, E. & Jacobs, J. 1985. The ecology of Lake Nakuru. VI. Synopsis of production and energy flow. *Oecologia* 65: 412–424.

Virani, M. 1993. Golden Cat in Arabuko-Sokoke? *EANHS Bulletin* 23(3): 51–52.

Virani, M.Z. 1994. *Ecology of the endangered Sokoke Scops Owl* (Otus ireneae). Unpublished MSc thesis, University of Leicester, UK.

Virani, M. 1995. Who gives a hoot? *Swara* 18(1): 24–27.

Virani, M. (in press) Home range and movement patterns of Sokoke Scops Owl *Otus ireneae*. *Ostrich* (suppl.)

Virani, M., Thorstrom, R. & Harper, D. 1997. What is happening to Naivasha's Fish Eagles? *Kenya Birds* 5(2): 98–100.

Wahome, J.M. 1992. Kisere Forest: a land of rare species. *EANHS Bulletin* 22(3): 39–40.

Waiyaki, E. 1992. Mass death of waterbirds at Dandora. *Kenya Birds* 1(2): 28.

Waiyaki, E.M. 1995. *Effects of forest fragmentation, isolation and structure on the richness and abundance of bird communities in major coastal forests of south coast, Kenya.* Unpublished MSc thesis, University of Kent, UK.

Waiyaki, E.M. 1996. An avifaunal survey of the Cherangani Hills forests, Kenya. *National Museums of Kenya, Centre for Biodiversity Research reports: Ornithology, 27.*

Waiyaki, E.M. 1998. An avifaunal survey of South

Nandi Forest. *Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology*, 30.

Waiyaki, E.M. & Bennun, L.A. 1993a. Resident and migratory waterbirds at Dandora Sewage Treatment Works. *National Museums of Kenya, Centre for Biodiversity Research Reports: Ornithology*, 11.

Waiyaki, E.M. & Bennun, L.A. 1993b. A waterbird survey of Lake Ol Tukai, Amboseli National Park. *National Museums of Kenya, Centre for Biodiversity Research Reports: Ornithology*, 12.

Waiyaki, E.M. & Bennun, L.A. 1996. Birds of the Lembus forests, South Baringo District, Kenya: A survey. *Research reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology*, 24.

Waiyaki, E.M. & Bennun, L.A. (in press). The avifauna of coastal forests in southern Kenya: status and conservation. *Ostrich*.

Wasilwa, S.N. 1997. *The change of land-use patterns in the Masai Mara, and its impact on the large herbivore populations*. Unpublished report. Nairobi: World Wide Fund for Nature.

Wass, P. 1994. A forest with a future? The challenge of conserving Arabuko Sokoke Forest. *Swara* 17(3): 8–11.

Wass, P. (ed) 1995. *Kenya's indigenous forests: Status, management and conservation*. Gland: IUCN.

Watson, R.W.M. 1980. Golden Cat in the Aberdare Forest. *EANHS Bulletin* 1980: 14.

Western, D. 1982. Amboseli. *Swara* 5(4): 8–14

Western, D. 1996. Nairobi Zoo? *Swara* 19(6)&20(1): 19–20.

Whitehead, P.J.P. 1959. Notes on a collection of fishes from the Tana River below Garissa, Kenya. *J. E. Afr. Nat. Hist. Soc.* 23(4), no. 101: 167–171

Wilder, C., Brooks, T. & Lens, L. (in press) Vegetation structure and composition of the Taita Hills forest fragments. *J. East Afr. Nat. Hist.*

Williams, J. 1967. *A field guide to the National Parks of East Africa*. London: Collins.

Wilson, A. 1988. The Mau: Kenya's hidden forest. *Swara* 11 (5): 25–27.

Wilson, A. 1989. *Guidebook to the Samburu-Buffalo Springs-Shaba National Reserves*. Nairobi: Friends of Conservation.

Wilson, A. n.d. *Masai Mara National Reserve: A visitor's guide book*. Nairobi: Friends of Conservation.

Wily, L. 1993. *Mount Elgon conservation and development project advisory report*. June 1993. Nairobi: KIFCON.

World Bank 1998. *African Development Indicators 1998/9*. Washington DC: The World Bank.

Young, S.W. 1994. *The forests on the Cherangani Hills, N.W. Kenya*. Unpublished report for Reaseheath College, Nantwich, Cheshire, UK

Young, T.P. & Evans, M.R. 1993. Alpine vertebrates of Mt Kenya, with particular notes on the Rock Hyrax. *J. East Afr. Nat. Hist. Soc. & Natl Mus.* Vol. 82, no. 202.

Zimmerman, D. A. 1972. The avifauna of Kakamega Forest, Western Kenya, including a bird population study. *Bull. Amer. Mus. Nat. Hist.* 149: 259–339.

Zimmerman, D.A, Turner, D.A, & Pearson, D.J. 1996. *Birds of Kenya and northern Tanzania*. Halfway House, South Africa: Russel Friedman Books.

6 APPENDICES

Appendix 1A
Globally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	Aberdare Mountains	Kianyanga Valleys	Kikuyu Escarpment Forest	Kinangop Grasslands	Mt Kenya	Mukurweini Valleys	Arabuko-Sokoke Forest	Dakatcha Woodland	Diani Forest	Dzombo Hill Forest	Gede Ruins National Monument	Kaya Gandini	Kaya Waa	Kisite Island	Kiunga Marine National Reserve	Malindi/Watamu Coast	Marenji Forest	Mrima Hill Forest
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
31	Shoebill	NT																		
43	Madagascar Squacco Heron	NT																		
69	Lesser Flamingo	NT																		
113	Southern Banded Snake Eagle	NT							●	●	●		●	●						
118	Pallid Harrier	NT				●														
146	Greater Spotted Eagle	VU																		
164	Taita Falcon	VU																		
170	Lesser Kestrel	VU					●													
216	Corncrake	VU																		
302	Great Snipe	NT																		
397	Fischer's Turaco	NT							●			●	●	●	●				●	●
430	Sokoke Scops Owl	VU							●											
626	Williams's Lark	NT																		
627	Friedmann's lark	NT																		
655	Blue Swallow	VU																		
686	Malindi Pipit	NT																		
692	Sokoke Pipit	VU							●	●		●	○	●					●	
693	Sharpe's Longclaw	EN-VU	●			●	●													
743	Hinde's Babbler	EN		●				●												
763	East Coast Akalat	VU							●											
817	Taita Thrush	CR																		
822	Spotted Ground Thrush	EN							●		●		●	●	●					●
832	Chapin's Flycatcher	VU																		
857	Basra Reed Warbler	NT																		
890	Papyrus Yellow Warbler	VU																		
910	Aberdare Cisticola	EN-VU	●			○														
916	Tana River Cisticola	DD																		
949	White-winged Apalis	VU																		
952.1	Taita Apalis	CR																		
975	Turner's Eremomela	VU																		
982.1	Taita White-eye	CR																		
982.2	Kulal White-eye	CR																		
991	Red-throated Tit	NT																		
1026	Grey-crested Helmet-shrike	VU																		
1066	Papyrus Gonolek	NT																		
1122	Abbott's Starling	VU	●		●		●													
1132	Plain-backed Sunbird	NT							●		●	●	●	●					●	●
1137	Amani Sunbird	VU							●											
1235	Clarke's Weaver	VU							●	●										
1260	Jackson's Widowbird	NT	●			●	●													
	Total species recorded		4	1	1	3	4	1	9	3	3	3	4	5	2	0	0	0	3	3

19	Sabaki River Mouth	20	Shimba Hills	21	Taita Hills Forests	22	Tana River Delta	23	Tana River Forests	24	Tsavo East National Park	25	Tsavo West National Park	26	Chyulu Hills	27	Dida Galgalu Desert	28	Lake Turkana	29	Machakos Valleys	30	Masinga Reservoir	31	Meru National Park	32	Mwea National Reserve	33	Samburu/Buffalo Springs Nat. R.	34	Shaba National Reserve	35	Dandora Ponds	36	Nairobi National Park	OSc#	Common Name
																																○	31	Shoebill
												●													●						●	43	Madagascar Squacco Heron
																		●														69	Lesser Flamingo
		●		●		●		●																								113	Southern Banded Snake Eagle
																																118	Pallid Harrier
																																146	Greater Spotted Eagle
				●																						●						164	Taita Falcon
										●		●														●		●			●	176	Lesser Kestrel
												●																			●	216	Corncrake
																																302	Great Snipe
		●						●																								397	Fischer's Turaco
																																430	Sokoke Scops Owl
																●												●				629	Williams's Lark
										●		●																				627	Friedmann's lark
						●		●																								685	Blue Swallow
●								●																								686	Malindi Pipit
		●																														692	Sokoke Pipit
																																693	Sharpe's Longclaw
																				●					●							743	Hinde's Babbler
		●						●																								767	East Coast Akalat
				●																												817	Taita Thrush
		●																														822	Spotted Ground Thrush
																																832	Chapin's Flycatcher
						●		●		●		●																			○	857	Basra Reed Warbler
																																890	Papyrus Yellow Warbler
																																910	Aberdare Cisticola
								○																								916	Tana River Cisticola
								●																								949	White-winged Apalis
				●																												952.1	Taita Apalis
																																975	Turner's Eremomela
				●																												982.1	Taita White-eye
																																982.2	Kulal White-eye
																															●	991	Red-throated Tit
																																1026	Grey-crested Helmet-shrike
																																1066	Papyrus Gonolek
				●										●																		1122	Abbott's Starling
		●						●																								1132	Plain-backed Sunbird
																																1137	Amani Sunbird
																																1235	Clarke's Weaver
																															●	1266	Jackson's Widowbird
1		6		6		3		7		3		5		1		1		1		1		0		0		2		2		0		5		Total species recorded

Appendix 1A
Globally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	Dunga Swamp	Kogutia Swamp	Kusa Swamp	Ruma National Park	Yala Swamp	Ambaseli National Park	Cherangani Hills	Lake Baringo	Lake Bogoria National Reserve	Lake Elmenteita	Lake Magadi	Lake Naivasha	Lake Nakuru National Park	Masai Mara	Mau Forest Complex	Mau Narok/Mau Grasslands	North Nandi Forest	Ol Donyo Sabache
			37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
31	Shoebill	NT						○								○				
43	Madagascar Squacco Heron	NT						●		○	●				●	●				
69	Lesser Flamingo	NT						●		○	●	●	●	○	●					
113	Southern Banded Snake Eagle	NT																		
118	Pallid Harrier	NT								●	●				●	●		●		
146	Greater Spotted Eagle	VU										○			●					
164	Taita Falcon	VU																		●
176	Lesser Kestrel	VU						●		●	●	●				●		●		
216	Corncrake	VU														●				
302	Great Snipe	NT					●											●		
397	Fischer's Turaco	NT																		
430	Sokoke Scops Owl	VU																		
626	Williams's Lark	NT																		
627	Friedmann's lark	NT																		
655	Blue Swallow	VU				●														
686	Malindi Pipit	NT																		
692	Sokoke Pipit	VU																		
693	Sharpe's Longclaw	P-VU																●		
743	Hinde's Babbler	EN																		
763	East Coast Akalat	VU																		
817	Taita Thrush	CR																		
822	Spotted Ground Thrush	EN																		
832	Chapin's Flycatcher	VU																	●	
857	Basra Reed Warbler	NT												●						
890	Papyrus Yellow Warbler	VU	●	●			●													
910	Aberdare Cisticola	P-VU																●		
916	Tana River Cisticola	DD																		
949	White-winged Apalis	VU																		
952.1	Taita Apalis	CR																		
975	Turner's Eremomela	VU																		
982.1	Taita White-eye	CR																		
982.2	Kulal White-eye	CR																		
991	Red-throated Tit	NT										○				●				
1026	Grey-crested Helmet-shrike	VU										●		●	●	●				
1066	Papyrus Gonolek	NT	●	●	●		●													
1122	Abbott's Starling	VU																		
1132	Plain-backed Sunbird	NT																		
1137	Amani Sunbird	VU																		
1235	Clarke's Weaver	VU																		
1266	Jackson's Widowbird	NT										●				●		●		
	Total species recorded		2	2	1	1	3	3	0	2	4	4	1	2	5	7	0	6	1	1

55 South Nandi Forest	56 South Ngaruman	57 Busia Grasslands	58 Kakamega Forest	59 Mt Elgon	60 Sio Port Swamp	Number sites recorded	OSc#	Common Name
						0	31	Shoebill
						7	43	Madagascar Squacco Heron
						6	69	Lesser Flamingo
						9	113	Southern Banded Snake Eagle
						6	118	Pallid Harrier
						1	146	Greater Spotted Eagle
						3	164	Taita Falcon
						12	176	Lesser Kestrel
						3	216	Corncrake
		●				3	302	Great Snipe
						9	397	Fischer s Turaco
						1	430	Sokoke Scops Owl
						2	626	Williams s Lark
						2	627	Friedmann s lark
		●				2	655	Blue Swallow
						3	686	Malindi Pipit
						6	692	Sokoke Pipit
				●		5	693	Sharpe s Longclaw
						4	743	Hinde s Babbler
						3	763	East Coast Akalat
						1	817	Taita Thrush
						7	822	Spotted Ground Thrush
			●			2	832	Chapin s Flycatcher
						5	857	Basra Reed Warbler
						3	890	Papyrus Yellow Warbler
						2	910	Aberdare Cisticola
						0	916	Tana River Cisticola
						1	949	White-winged Apalis
						1	952.1	Taita Apalis
●			●			2	975	Turner s Eremomela
						1	982.1	Taita White-eye
						0	982.2	Kulal White-eye
	●					3	991	Red-throated Tit
	●					5	1026	Grey-crested Helmet-shrike
					●	5	1066	Papyrus Gonolek
						5	1122	Abbott s Starling
						9	1132	Plain-backed Sunbird
						1	1137	Amani Sunbird
						2	1235	Clarke s Weaver
	●					8	1266	Jackson s Widowbird
1	3	2	2	1	1	Total species recorded		

Key to Status

CR	Critically Endangered
EN	Endangered
VU	Vulnerable
P-VU	Provisionally Vulnerable (status to be confirmed)
DD	Data Deficient
NT	Near-threatened

Appendix 1B
Regionally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	1 Aberdare Mountains	2 Kianyaga Valleys	3 Kikuyu Escarpment Forest	4 Kinangop Grasslands	5 Mt Kenya	6 Mukurweini Valleys	7 Arabuko-Sokoke Forest	8 Dakatcha Woodland	9 Diani Forest	10 Dzombo Hill Forest	11 Gede Ruins National Monument	12 Kaya Gandini	13 Kaya Waa	14 Kiunga Island	15 Kiunga Marine National Reserve	16 Malindi/Watamu Coast	17 Marenji Forest	18 Mrima Hill Forest
1	Common Ostrich	VU																		
3	Great Crested Grebe	CR				○														
28	African Darter	VU																		
47	Great Egret	VU							○								●	●		
57	Saddle-billed Stork	VU																		
63	African Green Ibis	VU	●		●		●													
72	White-backed Duck	EN																		
84	Maccoa Duck	EN																		
103	Lammergeier	VU					●													
104	White-headed Vulture	VU																		
114	Banded Snake Eagle	VU																		
154	Ayres's Hawk Eagle	VU	●		●		●		●											
157	African Crowned Eagle	VU	●		●		●		●		●	●								
158	Martial Eagle	VU																		
179	Blue Quail	VU																		
185	Ring-necked Francolin	VU																		
189	Orange River Francolin	VU																		
207	Black-rumped Button-quail	EN																		
213	Striped Flufftail	VU	●																	
218	Baillon's Crake	VU	●																	
232	African Finfoot	VU							○											
233	Denham's Bustard	EN																		
262	Rock Pratincole	VU																		
338	Roseate Tern	VU														●	●	●		
348	African Skimmer	VU																		
428	African Grass Owl	VU	●				●													
435	Cape Eagle-Owl	VU	●				●													
440	Pel's Fishing Owl	VU																		
442	Red-chested Owlet	VU			●															
494	Shining-blue Kingfisher	VU																		
526	Forest Wood-hoopoe	VU																		
529	Violet Wood-hoopoe	VU																		
588	Thick-billed Honeyguide	VU																		
589	Least Honeyguide	VU																		
595	Cassin's Honeybird	VU																		

Sabaki River Mouth	Shimba Hills	Taita Hills Forests	Tana River Delta	Tana River Forests	Tsavo East National Park	Tsavo West National Park	Chyulu Hills	Dida Galgalla Desert	Lake Turkana	Machakos Valleys	Masinga Reservoir	Meru National Park	Mwea National Reserve	Samburu/Buffalo Springs Nat. R.	Shaba National Reserve	Dandora Ponds	Nairobi National Park	OSc#	Common Name
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
						●											●	1	Common Ostrich
																		5	Great Crested Grebe
			●	●	●	●					●		●	●	●		●	28	African Darter
●			●		●	●			●		●			●	●	●	●	47	Great Egret
			●	●	●	●			●								●	57	Saddle-billed Stork
																		63	African Green Ibis
																	●	72	White-backed Duck
									●									84	Maccoa Duck
																		103	Lammergeier
					●	●								●	●			109	White-headed Vulture
									●									114	Banded Snake Eagle
	●	●		●			●										●	154	Ayres's Hawk Eagle
	●	●		●			●										●	157	African Crowned Eagle
					●	●	●				○	●	●	●	●		●	158	Martial Eagle
						●												179	Blue Quail
																		185	Ring-necked Francolin
																		189	Orange River Francolin
																		207	Black-rumped Button-quail
																		213	Striped Flufftail
																		218	Baillon's Crake
				●	●	●						●					●	232	African Finfoot
																		233	Denham's Bustard
			○															262	Rock Pratincole
																		335	Roseate Tern
●									●									348	African Skimmer
																		428	African Grass Owl
																		435	Cape Eagle-Owl
				●								●	●					440	Pel's Fishing Owl
																		442	Red-chested Owlet
																		494	Shining-blue Kingfisher
																		526	Forest Wood-hoopoe
				●	●	●						●						529	Violet Wood-hoopoe
																		588	Thick-billed Honeyguide
																		589	Least Honeyguide
																		595	Cassin's Honeybird

Appendix 1B
Regionally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	Dunga Swamp	Kogatta Swamp	Kusa Swamp	Ruma National Park	Yala Swamp	Amboseli National Park	Cherangani Hills	Lake Baringo	Lake Bogoria National Reserve	Lake Elmenteita	Lake Magadi	Lake Naivasha	Lake Nakuru National Park	Masai Mara	Mau Forest Complex	Mau Narok / Mole Grasslands	North Nandi Forest	Ol Donyo Sabache
			37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
1	Common Ostrich	VU						●								●				
3	Great Crested Grebe	CR								○		●		●	●			●		
28	African Darter	VU						●		●	●			●		○				
47	Great Egret	VU					●	●		●	●	●	●	●	●	●				
57	Saddle-billed Stork	VU								○		●		●		●				
63	African Green Ibis	VU																	●	
72	White-backed Duck	EN						●		○	●			●						
94	Maccoa Duck	EN									●			●	●					
103	Lammergeier	VU							●											
109	White-headed Vulture	VU						●		○	●	●				●				
114	Banded Snake Eagle	VU														●				
134	Ayres's Hawk Eagle	VU										●				○	●			●
137	African Crowned Eagle	VU							●			●				●	●		●	●
138	Martial Eagle	VU						●		○	●	●			●	●				●
179	Blue Quail	VU														○				
185	Ring-necked Francolin	VU																		
189	Orange River Francolin	VU																		
207	Black-rumped Button-quail	LN																		
213	Striped Flufftail	VU																		
218	Baillon's Crake	VU					●			●						○				
232	African Finfoot	VU												○		●				
233	Denham's Bustard	LN														●				
262	Rock Pratincole	VU																		
335	Roseate Tern	VU																		
348	African Skimmer	VU								●				○	●					
428	African Grass Owl	VU															●			
435	Cape Eagle-Owl	VU															●			
440	Pel's Fishing Owl	VU																		
442	Red-chested Owlet	VU							●								●		●	
494	Shining-blue Kingfisher	VU																		
526	Forest Wood-hoopoe	VU																		
529	Violet Wood-hoopoe	VU																		
588	Thick-billed Honeyguide	VU							●										●	
589	Least Honeyguide	VU															●		●	
593	Cassin's Honeybird	VU																		

55 South Nandi Forest	56 South Ngururman	57 Busia Grasslands	58 Kakamega Forest	59 Mt Elgon	60 Sio Port Swamp	Number sites recorded	OSc#	Common Name
						4	1	Common Ostrich
						4	3	Great Crested Grebe
						13	28	African Darter
						21	47	Great Egret
						9	57	Saddle-billed Stork
						4	63	African Green Ibis
						4	72	White-backed Duck
						4	94	Maccoa Duck
	○			●		3	103	Lammergeier
						8	109	White-headed Vulture
		●	●			4	114	Banded Snake Eagle
			●			13	134	Ayres's Hawk Eagle
●	●		●	●		21	157	African Crowned Eagle
						14	158	Martial Eagle
						1	179	Blue Quail
				●		1	185	Ring-necked Francolin
						0	189	Orange River Francolin
						0	207	Black-rumped Button-quail
	●			●		3	213	Striped Flufftail
						3	218	Baillon's Crake
						6	232	African Finfoot
						1	233	Denham's Bustard
						0	262	Rock Pratincole
						3	333	Roseate Tern
						4	348	African Skimmer
						3	428	African Grass Owl
						4	435	Cape Eagle-Owl
						3	440	Pel's Fishing Owl
●			●	●		7	442	Red-chested Owlet
		○	○			0	494	Shining-blue Kingfisher
				○		0	526	Forest Wood-hoopoe
						4	529	Violet Wood-hoopoe
●			●	●		5	588	Thick-billed Honeyguide
●			●			4	589	Least Honeyguide
			●			1	595	Cassin's Honeybird

Key to Regional Status

CR	Critically Endangered
EN	Endangered
VU	Vulnerable

Appendix 1B
Regionally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	1 Aberdare Mountains	2 Kianyaga Valleys	3 Kikuyu Escarpment Forest	4 Kinangop Grasslands	5 Mt Kenya	6 Mukurweini Valleys	7 Arabuko-Sokoke Forest	8 Dakatcha Woodland	9 Diani Forest	10 Dzombo Hill Forest	11 Gede Ruins National Monument	12 Kaya Gandini	13 Kaya Waa	14 Kisite Island	15 Kiunga Marine National Reserve	16 Malindi/Watamu Coast	17 Maneji Forest	18 Mrima Hill Forest
622	African Pitta	VU							●		○		●							
632	Collared Lark	VU																		
710	Toro Olive Greenbul	VU																		
711	Scaly Babbler	VU							●				●							
749	Grey-chested Illadopsis	VU																		
766	Grey-winged Robin	VU																		
980	Southern Hyliota	EN																		
997	Little Yellow Flycatcher	VU							●		●		●						●	●
1023	Yellow-bellied Wattle-eye	VU																		
1078	Purple-throated Cuckoo-shrike	VU	●				●													
1130	Yellow-billed Oxpecker	VU																		
1136	Uluguru Violet-backed Sunbird	VU									●									
1225	Heuglin's Masked Weaver	VU																		
1263	Hartlaub's Marsh Widowbird	VU																		
1265	Long-tailed Widowbird	VU	●			●	●													
	Total species recorded		9	0	4	1	8	0	5	0	3	1	3	0	0	1	2	2	1	1

Sabaki River Mouth	Shimba Hills	Taita Hills Forests	Tana River Delta	Tana River Forests	Tsavo East National Park	Tsavo West National Park	Chyulu Hills	Dida Galgalu Desert	Lake Turkana	Machakos Valleys	Masinga Reservoir	Meru National Park	Mwea National Reserve	Samburu/Buffalo Springs Nat. R.	Shaba National Reserve	Dundora Ponds	Nairobi National Park	OSc#	Common Name
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
	●																	622	African Pitta
																		632	Collared Lark
																		710	Toro Olive Greenbul
			●	●														741	Scaly Babbler
																		749	Grey-chested Illadopsis
																		766	Grey-winged Robin
																		980	Southern Hyliota
	●			●														997	Little Yellow Flycatcher
																		1023	Yellow-bellied Wattle-eye
																		1079	Purple-throated Cuckoo-shrike
					○	●								●	●		●	1130	Yellow-billed Oxpecker
	●			●														1136	Uluguru Violet-backed Sunbird
																		1225	Heuglin's Masked Weaver
																		1263	Hartlaub's Marsh Widowbird
																		1265	Long-tailed Widowbird
2	5	2	4	10	7	10	3	0	5	0	2	4	3	5	5	1	10	Total species recorded	

Appendix 1B
Regionally-threatened species at IBAs in Kenya

OSc#	Common Name	Status	Dunga Swamp	Kogutu Swamp	Kusa Swamp	Ruma National Park	Yala Swamp	Amboseli National Park	Cherangani Hills	Lake Baringo	Lake Bogoria National Reserve	Lake Elmenteita	Lake Magadi	Lake Naivasha	Lake Nakuru National Park	Masai Mara	Mau Forest Complex	Mau Narok/Moto Grasslands	North Nandi Forest	Ol Donyo Sabache
			37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
622	African Pitta	VU																		
632	Collared Lark	VU																		
710	Toro Olive Greenbul	VU																		
741	Scaly Babbler	VU																		
749	Grey-chested Illadopsis	VU															●		●	
760	Grey-winged Robin	VU															●			
980	Southern Hyliota	EN																	●	
997	Little Yellow Flycatcher	VU																		
1023	Yellow-bellied Wattle-eye	VU																	●	
1079	Purple-throated Cuckoo-shrike	VU							●								●			
1130	Yellow-billed Oxpecker	VU										●				●				
1136	Uluguru Violet-backed Sunbird	VU																		
1225	Heuglin's Masked Weaver	VU																		
1263	Hartlaub's Marsh Widowbird	VU																		
1265	Long-tailed Widowbird	VU										●			●					
	Total species recorded		0	0	0	0	2	6	5	4	6	9	1	6	6	10	8	1	8	3

South Nandi Forest	South Ngurumani	Busia Grasslands	Kakamega Forest	Mt Elgon	Sio Port Swamp	Number sites recorded	OSc#	Common Name
55	56	57	58	59	60			
						3	622	African Pitta
						0	632	Collared Lark
			●	○		1	710	Toro Olive Greenbul
						4	741	Scaly Babbler
●			●	○		3	749	Grey-chested Illadopsis
●			●	●		4	760	Grey-winged Robin
●			●			3	980	Southern Hyliota
						7	997	Little Yellow Flycatcher
●			●			3	1023	Yellow-bellied Wattle-eye
	●		●	●		7	1079	Purple-throated Cuckoo-shrike
						6	1130	Yellow-bellied Oxpecker
						3	1136	Ulugura Violet-backed Sunbird
						0	1225	Heuglin's Masked Weaver
		●	●			2	1263	Hartlaub's Marsh Widowbird
						5	1265	Long-tailed Widowbird
8	3	2	14	8	0			**Total species recorded**

Key to Regional Status

CR	Critically Endangered
EN	Endangered
VU	Vulnerable

Appendix 2
Restricted-range species at IBAs in Kenya

OSc#	Common Name	1 Aberdare Mountains	2 Kianyanga Valleys	3 Kikuyu Escarpment Forest	4 Kinangop Grasslands	5 Mt Kenya	6 Mukurtweini Valleys	7 Arabuko-Sokoke Forest	8 Dakatcha Woodland	9 Diani Forest	10 Dzombo Hill Forest	11 Gede Ruins National Monument	12 Kaya Gandini	13 Kaya Waa	17 Mareniji Forest	18 Mrima Hill Forest	20 Shimba Hills
	Kenyan Mountains EBA																
196	Jackson's Francolin	●		●		●											
693	Sharpe's Longclaw	●			●	●											
743	Hinde's Babbler		●				●										
898	Hunter's Cisticola	●		●	●	●											
910	Aberdare Cisticola	●			●												
1101	Kenrick's Starling					●											
1122	Abbott's Starling	●		●		●											
1266	Jackson's Widowbird	●				●											
	Serengeti Plains EBA																
1026	Grey-crested Helmet-shrike																
583.1	Usambiro Barbet																
	East African Coastal Forests EBA																
397	Fischer's Turaco							●	●	●	●	●	●	●	●	●	●
430	Sokoke Scops Owl							●									
692	Sokoke Pipit							●	●		●	●	●		●		●
916	Tana River Cisticola																
949	White-winged Apalis																
1137	Amani Sunbird							●									
1235	Clarke's Weaver							●	●								
	Tanzania-Malawi Mountains EBA																
817	Taita Thrush																
952.1	Taita Apalis																
982.1	Taita White-eye																
	Jubba and Shabeele Valleys EBA																
1223	Juba Weaver																
374	African White-winged Dove																
	Kakamega & Nandi Forests SA																
832	Chapin's Flycatcher																
	Mt Kulal SA																
982.2	Kulal White-eye																
	North Kenyan Short-grass Plains SA																
626	Williams's Lark																
	Total species recorded	6	1	3	3	6	1	5	3	1	2	2	2	1	2	1	2

Taita Hills Forests	Tana River Forests	Chyulu Hills	Dida Galgalu Desert	Machakos Valleys	Mwea National Reserve	Shaba National Reserve	Nairobi National Park	Cherangani Hills	Lake Elmenteita	Lake Naivasha	Lake Nakuru National Park	Masai Mara	Mau Forest Complex	Mau Narok/Molo Grasslands	North Nandi Forest	Ol Donyo Sabache	South Ngurumun	Kakamega Forest	Mt Elgon	Total sites recorded	Common Name
21	23	26	27	29	32	34	36	43	46	48	49	50	51	52	53	54	56	58	59		
													●						●	5	Jackson's Francolin
														●					●	5	Sharpe's Longclaw
				●	●															4	Hinde's Babbler
								●					●	●		●	●		●	10	Hunter's Cisticola
														●						3	Aberdare Cisticola
		●																		1	Kenrick's Starling
																				4	Abbott's Starling
							●		●			●		●			●			7	Jackson's Widowbird
									●	●	●	●					●			5	Grey-crested Helmet-shrike
												●								1	Usambiro Barbet
	●																			11	Fischer's Turaco
																				1	Sokoke Scops Owl
	●																			7	Sokoke Pipit
	○																			0	Tana River Cisticola
	●																			1	White-winged Apalis
																				1	Amani Sunbird
																				2	Clarke's Weaver
●																				1	Taita Thrush
●																				1	Taita Apalis
●																				1	Taita White-eye
																				0	Juba Weaver
																				0	African White-winged Dove
															●			●		2	Chapin's Flycatcher
																				0	Kulal White-eye
			●			●														2	Williams's Lark
3	2	1	1	1	1	1	1	1	2	1	1	3	2	4	1	1	3	1	3		Total species recorded

Appendix 3A
Biome species
Somali—Masai

OSc#	Common Name	2 Kinyanga Valleys	6 Mukurweini Valleys	22 Tana River Delta	23 Tana River Forests	24 **Tsavo East National Park**	25 **Tsavo West National Park**	26 Chyulu Hills	27 **Dida Galgalu Desert**	28 **Lake Turkana**	29 Machakos Valleys	30 Masinga Reservoir	31 **Meru National Park**	32 Mwea National Reserve	33 **Samburu/Buffalo Springs Natl. Reserves**
	(92 Kenyan species)														
124	Eastern Pale Chanting Goshawk			●		●	●	●	●	●	●		●	●	●
199	Yellow-necked Spurfowl	●	●	●		●	●	●	●	●	●	●	●	●	●
203	Vulturine Guineafowl			●		●	●		●	●			●		●
234	Heuglin s Bustard					●			●	●					
350	Black-faced Sandgrouse			●		●	●	●	●				●		●
374	African White-winged Dove														
383	African Orange-bellied Parrot					●	●						●	●	●
401	White-bellied Go-away Bird			●		●	●	●		●	●	●	●	●	●
432	Abyssinian Scimitarbill			●		●	●	●		●	●	●	●	●	●
450	Donaldson-Smith s Nightjar			●	●	●	●	●	●			●	●		●
453	Star-spotted Nightjar								●	●					
456	Dusky Nightjar	●				●	●		●		●		●		●
474	Forbes-Watson s Swift														
481	White-headed Mousebird			●			●			●					●
519	Somali Bee-eater					●	●		●	●			●		●
539	Eastern Yellow-billed Hornbill				●	●	●		●	●			●		●
540	Von der Decken s Hornbill			●	●	●	●	●	●		●		●	●	●
541	Jackson s Hornbill									●					
542	Hemprich s Hornbill														
571	Black-throated Barbet					●	●		●	●			●		●
582	Red-and-yellow Barbet				●	●	●		●		●		●		●
583	D Arnaud s Barbet				●	●	●		●	●	●		●	●	●
626	Williams s Lark								●						
627	Friedmann s Lark					●	●								
630	Red-winged Lark					●	●		●				●		●
632	Collared Lark														
634	Gillet s Lark														
635	Pink-breasted Lark					●	●		●	●			●		●
638	Greater Short-toed Lark														
641	Somali Short-toed Lark														●
642	Masked Lark								●						
643	Short-tailed Lark								●						
649	Chestnut-headed Sparrow-Lark			●	●	●			●	●			●		●
679	Golden Pipit			●	●	●	●						●		●
696	Pangani Longclaw			●		●	●						●		

34	Shaba National Reserve	36	Nairobi National Park	42	Amboseli National Park	44	Lake Baringo	45	Lake Bogoria National Reserve	46	Lake Elmenteita	47	Lake Magadi	48	Lake Naivasha	49	Lake Nakuru National Park	50	Masai Mara	54	Ol Donyo Sabache	56	South Ngurumian	59	Mt Elgon	Total sites recorded	OSc#	Common Name
																											(92 Kenyan species)
●		●		●								●				●				●		●			16	124	Eastern Pale Chanting Goshawk
●		●		●		●		●		●		●				●		●		●		●			24	199	Yellow-necked Spurfowl
●																				●					6	203	Vulturine Guineafowl
●																									4	234	Heuglin's Bustard
●		●		●								●						●		●		●			14	350	Black-faced Sandgrouse
																									10	374	African White-winged Dove
●				●																●					8	383	African Orange-bellied Parrot
●		●		●		●		●				●								●					17	401	White-bellied Go-away Bird
●		●		●		●		●				●				●				●		●			19	432	Abyssinian Scimitarbill
●						●		●												●					13	450	Donaldson-Smith's Nightjar
																									2	453	Star-spotted Nightjar
●		●		●						●		●				●		●				●		●	16	456	Dusky Nightjar
																									10	474	Forbes-Watson's Swift
●				●																●					7	481	White-headed Mousebird
●																									7	516	Somali Bee-eater
●				●		●		●												●					12	539	Eastern Yellow-billed Hornbill
●		●		●								●						●		●		●			17	540	Von der Decken's Hornbill
						●		●																	3	541	Jackson's Hornbill
						●		●								●									3	542	Hemprich's Hornbill
●				●		●		●				●								●					12	571	Black-throated Barbet
●		●		●		●		●				●								●		●			13	582	Red-and-yellow Barbet
●		●		●		●		●				●				●		●		●		●			19	583	D'Arnaud's Barbet
●																									2	626	Williams's Lark
																									2	627	Friedmann's Lark
●																				●					7	630	Red-winged Lark
																									9	632	Collared Lark
																									9	634	Gillet's Lark
●				●		●		●												●					11	635	Pink-breasted Lark
																									9	636	Greater Short-toed Lark
		●																							2	641	Somali Short-toed Lark
●																									2	642	Masked Lark
		●																							2	643	Short-tailed Lark
●																									8	649	Chestnut-headed Sparrow Lark
●				●																					8	679	Golden Pipit
																									4	698	Pangani Longclaw

Appendix 3A
Biome species
Somali-Masai

OSc#	Common Name	2 Kianyaga Valleys	6 Mukurweini Valleys	22 Tana River Delta	23 Tana River Forests	24 **Tsavo East National Park**	25 **Tsavo West National Park**	26 Chyulu Hills	27 **Dida Galgalu Deseri**	28 **Lake Turkana**	29 Machakos Valleys	30 Masinga Reservoir	31 **Meru National Park**	32 Mwea National Reserve	33 **Samburu/Buffalo Springs Natl. Reserves**
	(92 Kenyan species)														
743	Hinde's Babbler	●	●								●	○		●	
744	Northern Pied Babbler	●	●								●		●	●	
746	Rufous Chatterer			●		●	●		●	●	●		●	●	●
747	Scaly Chatterer			●		●	●						●		
803	Brown-tailed Rock Chat									●					●
820	Bare-eyed Thrush					●	●				●		●		●
844	African Grey Flycatcher				●	●	●		●	●	●		●	●	●
903	Tiny Cisticola					●	●						●		●
913	Boran Cisticola														
917	Ashy Cisticola				●	●	●		●				●		●
925	Pale Prinia					●	○			●					●
930	Grey Wren Warbler				●	●	●		●	●	●		●		●
966	Somali Long-billed Crombec					●	○						●		●
971	Yellow-vented Eremomela					●			●	●			●		●
978	Banded Parisoma					●	●	●					●		●
981	Abyssinian White-eye				●	●	●				●		●	●	●
985	Northern Grey Tit					●	●		●				●		●
991	Red-throated Tit														
993	Mouse-coloured Penduline Tit					●	●		●				●		●
1026	Grey-crested Helmet-shrike														
1040	Long-tailed Fiscal			●		●	●						●		●
1041	Taita Fiscal					●	●		●	●			●		●
1042	Somali Fiscal								●	●					
1049	Three-streaked Tchagra			●		●	●		●				●		●
1061	Rosy-patched Bush-Shrike					●	●		●	●			●		●
1062	Red-naped Bush-Shrike					●	●								
1074	Pringle's Puffback					●	●						●		●
1106	Bristle-crowned Starling								●	●					●
1116	Hildebrandt's Starling					●	●						●		●
1117	Shelley's Starling					●							●		
1119	Golden-breasted Starling			●		●	●		●				●		●
1124	Fischer's Starling			●	●	●	●						●		●
1125	White-crowned Starling								●						
1126	Magpie Starling					●				●					●
1135	Eastern Violet-backed Sunbird			●	●	●	●		●				●		●

34	Shaba National Reserve	36	Nairobi National Park	42	Amboseli National Park	44	Lake Baringo	45	Lake Bogoria National Reserve	46	Lake Elmenteita	47	Lake Magadi	48	Lake Naivasha	49	Lake Nakuru National Park	50	Masai Mara	54	Ol Donyo Sabache	56	South Ngurumani	59	Mt Hagon	Total sites recorded	OSc#	Common Name
																											(92 Kenyan species)
			●		●																				4	743	Hinde's Babbler
			●		●																				7	744	Northern Pied Babbler
	●		●		●		●		●																14	746	Rufous Chatterer
													●												5	747	Scaly Chatterer
	●						●		●																5	805	Brown-tailed Rock Chat
	●				●															●					8	820	Bare-eyed Thrush
	●		●		●		●		●				●				●		●	●		●			19	844	African Grey Flycatcher
	●				●								●									●			8	903	Tiny Cisticola
																								●	1	913	Boran Cisticola
	●												●							●		●			10	917	Ashy Cisticola
	●						●																		3	925	Pale Prinia
	●				●		●		●				●				●		●			●			16	930	Grey Wren Warbler
	●																								4	966	Somali Long-billed Crombec
	●																								6	971	Yellow-vented Eremomela
	●		●		●								●						●			●			11	978	Banded Parisoma
	●		●		●		●		●													●			13	981	Abyssinian White-eye
	●				●		●		●																6	985	Northern Grey Tit
			●		●														●			●			4	991	Red-throated Tit
	●						●		●																8	993	Mouse-coloured Penduline Tit
											●						●		●			●			4	1026	Grey-crested Helmet-shrike
	●		●		●								●						●			●			11	1040	Long-tailed Fiscal
	●		○		●								●						●			●			11	1041	Taita Fiscal
																									2	1042	Somali Fiscal
	●						●		●																9	1049	Three-streaked Tchagra
	●				●								●									●			10	1061	Rosy-patched Bush-Shrike
																									2	1062	Red-naped Bush-Shrike
	●																								5	1074	Pringle's Puffback
	●						●																		5	1106	Bristle-crowned Starling
	●		●		●														●			●			9	1116	Hildebrandt's Starling
																									2	1117	Shelley's Starling
	●																								7	1119	Golden-breasted Starling
	●				●																				8	1124	Fischer's Starling
																									1	1125	White-crowned Starling
	●				●		●		●																6	1126	Magpie Starling
	●		○		●		●		●				●									●			13	1135	Eastern Violet-backed Sunbird

Appendix 3A
Biome species
Somali-Masai

OSc#	Common Name	Kianyanga Valleys	Mukurweini Valleys	Tana River Delta	Tana River Forests	Tsavo East National Park	Tsavo West National Park	Chyulu Hills	Dida Galgalu Desert	Lake Turkana	Machakos Valleys	Masinga Reservoir	Meru National Park	Mwea National Reserve	Samburu/Buffalo Springs Natl. Reserves
		2	6	22	23	24	25	26	27	28	29	30	31	32	33
	(92 Kenyan species)														
1161	Hunter's Sunbird					●	●		●	●			●		●
1171	Black-bellied Sunbird				●	●	●						●		●
1174	Shining Sunbird									●			●		●
1186	Somali Sparrow									●					
1193	White-headed Buffalo Weaver			●	●	●	●		●	●			●		●
1196	Donaldson-Smith's Sparrow Weaver								●	●					●
1201	Black-capped Social Weaver					●	●						●		●
1216	Golden Palm Weaver			●	●								●		●
1217	Taveta Golden Weaver						●								
1221	Rüppell's Weaver														
1223	Juba Weaver														
1230	Speke's Weaver	●									●				
1252	Fire-fronted Bishop					●	●						●		●
1310	Blue-capped Cordon-bleu					●	●		●				●		●
1311	Purple Grenadier			●		●	●		●	●	●		●	●	●
1317	Grey-headed Silver-bill					●	●						●		●
1327	Steel-blue Whydah					●			●				●	●	●
1329	Straw-tailed Whydah					●	●		●		●		●		●
1336	White-bellied Canary					●	●								●
1338	Southern Grosbeak Canary						●								
1339	Northern Grosbeak Canary								●	●					
1355	Somali Golden-breasted Bunting					●	●		●	●			●		●
	Total species recorded	5	3	22	16	60	55	8	44	34	18	4	57	14	61

34	Shaba National Reserve	36	Nairobi National Park	42	Amboseli National Park	44	Lake Baringo	45	Lake Bogoria National Reserve	46	Lake Elmenteita	47	Lake Magadi	48	Lake Naivasha	49	Lake Nakuru National Park	50	Masai Mara	54	Ol Donyo Sabache	56	South Nguruman	59	Mt Elgon	Total sites recorded	OSc#	Common Name
																											(92 Kenyan species)
●				●		●		●																	10	1151	Hunter's Sunbird
●				●																					7	1171	Black-bellied Sunbird
●						●																			5	1174	Shining Sunbird
																									1	1186	Somali Sparrow
●				●		●		●										●							13	1193	White-headed Buffalo Weaver
●																									4	1196	Donaldson-Smith's Sparrow Weaver
●																									3	1201	Black-capped Social Weaver
●																									5	1216	Golden Palm Weaver
				●																					2	1217	Taveta Golden Weaver
																									0	1221	Rüppell's Weaver
																									0	1223	Juba Weaver
		●		●										●		●									6	1230	Speke's Weaver
●												●		○											4	1252	Fire-fronted Bishop
●		○		●		●		●				●										●			11	1310	Blue-capped Cordon-bleu
●		●		●		●		●		●		●		●		●		●				●			20	1311	Purple Grenadier
●				●		●		●				●						●				●			11	1317	Grey-headed Silverbill
●				●		●		●				●													10	1327	Steel-blue Whydah
●				●		●		●				●										●			12	1329	Straw-tailed Whydah
●		●		●		●		●				●						●				●			11	1336	White-bellied Canary
		●		●								●										●			5	1338	Southern Grosbeak Canary
						●		●																	4	1339	Northern Grosbeak Canary
●						●		●																	9	1355	Somali Golden-breasted Bunting
63		23		42		35		31		4		28		2		10		17		19		27		2			Total species recorded

Appendix 3B
Biome species
Afrotropical Highlands

OSc#	Common Name	1 Aberdare Mountains	2 Kianyaaga Valleys	3 Kikuyu Escarpment Forest	4 Kinangop Grasslands	5 Mt Kenya	6 Mukurweini Valleys	21 Taita Hills Forests	26 Chyulu Hills	29 Machakos Valleys	36 Nairobi National Park	43 Cherangani Hills	46 Lake Elmenteita	48 Lake Naivasha	49 Lake Nakuru National Park
	(67 Kenyan species)														
139	Mountain Buzzard	●		●		●		●	●			●			
187	Moorland Francolin	●				●									
213	Striped Flufftail	●				●									
398	Hartlaub's Turaco	●		●		●		●	●		●	●			
415	African Long-eared Owl					●									
449	Montane Nightjar	●		●		●			●		●	●			
468	Scarce Swift	●		●		●		●				●			
473	Nyanza Swift	●			●	●					●	●	●	●	●
485	Bar-tailed Trogon	●		●		●						●			
514	Cinnamon-chested Bee-eater	●	●	●		●	●				●	●			
560	Moustached Green Tinkerbird	●		●		●		●	●		●	●			
606	Fine-banded Woodpecker	●		●		●						●			
693	Sharpe's Longclaw	●			●	●									
704	Shelley's Greenbul														
707	Mountain Greenbul	●		●		●		○				●			
725	Joyful Greenbul														
737	African Hill Babbler	●		●		●			●		●	●			
749	Grey-chested Illadopsis														
751	Mountain Illadopsis											●			
756	White-starred Robin	●		●		●		●	●		●	●			
761	Equatorial Akalat											●			
771	Rüppell's Robin Chat	●	●	●		●		●	●		●				
806	Alpine Chat	●				●						●			
814	Little Rock Thrush					●						●	●	●	●
825	Orange Ground Thrush	●		●		●		●	●						
826	Abyssinian Ground Thrush	●		●		●						●			
832	Chapin's Flycatcher														
840	White-eyed Slaty Flycatcher	●	●	●		●	●		●		●	●	●	●	●
876	Brown Woodland Warbler	●		●		●			●		●	●			
884	Cinnamon Bracken Warbler	●		●		●			●			●			
892	Mountain Yellow Warbler	●		●		●						●			
898	Hunter's Cisticola	●		●	●	●						●			
899	Chubb's Cisticola											●			
910	Aberdare Cisticola	●			●										
940	Chestnut-throated Apalis	●		●		●						●			

50	Masai Mara	51	Mau Forest Complex	52	Mau Narok/Mau Grasslands	53	North Nandi Forest	54	Ol Donyo Sabachi	55	South Nandi Forest	56	South Ngurumun	58	Kakamega Forest	59	Mt Elgon		Number sites recorded	OSc#	Common Name
																					(67 Kenyan Species)
		●		●										●		●		10	139		Mountain Buzzard
		●		●												●		5	187		Moorland Francolin
												●				●		4	213		Striped Flufftail
		●				●				●		●		○		●		12	398		Hartlaub's Turaco
																		1	445		African Long-eared Owl
○		●		●								●				●		10	449		Montane Nightjar
●		●												●		●		9	468		Scarce Swift
●		●		●														11	473		Nyanza Swift
		●								●				●		●		8	485		Bar-tailed Trogon
●		●				●				●		●		●		●		14	514		Cinnamon-chested Bee-eater
		●								●		●				●		11	560		Moustached Green Tinkerbird
●		●										●		○		●		8	606		Fine-banded Woodpecker
				●												●		5	693		Sharpe's Longclaw
		●				●				●				●		○		4	704		Shelley's Greenbul
		●										●				●		7	708		Mountain Greenbul
●		●				●				●				●		●		6	725		Joyful Greenbul
○		●				●				●		●		●		●		12	737		African Hill Babbler
						●				●				●		○		3	749		Grey-chested Illadopsis
		●				●				●				●		●		6	751		Mountain Illadopsis
		●				●						●				●		11	756		White-starred Robin
		●				●				●				●		●		6	761		Equatorial Akalat
																		7	771		Rüppell's Robin Chat
																●		4	806		Alpine Chat
								●										6	814		Little Rock Thrush
																		5	825		Orange Ground Thrush
		●				●						●				●		8	826		Abyssinian Ground Thrush
						●								●				2	832		Chapin's Flycatcher
●		●				●				●		●		●		●		18	840		White-eyed Slaty Flycatcher
		●				●				●		●				●		11	876		Brown Woodland Warbler
		●				●				●		●		○		●		10	884		Cinnamon Bracken Warbler
		●				●				●		●				●		9	892		Mountain Yellow Warbler
		●		●				●				●				●		10	898		Hunter's Cisticola
		●				●				●				●		●		6	899		Chubb's Cisticola
				●														3	910		Aberdare Cisticola
		●								●		●				●		8	940		Chestnut-throated Apalis

Appendix 3B
Biome species
Afrotropical Highlands

OSc#	Common Name	1 Aberdare Mountains	2 Kinyanga Valleys	3 Kikuyu Escarpment Forest	4 Kinangop Grasslands	5 Mt Kenya	6 Mukurweini Valleys	21 Taita Hills Forests	26 Chyulu Hills	29 Machakos Valleys	36 Nairobi National Park	43 Cherangani Hills	46 Lake Elmenteita	48 Lake Naivasha	49 Lake Nakuru National Park
	(67 Kenyan species)														
950	Black-collared Apalis	●	●	●		●					●	●			
952.1	Taita Apalis							●							
967	White-browed Crombec	●		●		●					●	●			
977	Brown Parisoma				●						●	●	●	●	
982	Montane White-eye	●		●		●			●		●	●			
982.1	Taita White-eye							●							
982.2	Kulal White-eye														
1002	White-tailed Crested Flycatcher	●		●		●		○				●			
1055	Doherty's Bush Shrike	●				●						●			
1080	Grey Cuckoo Shrike	●		●		●		●			●	●			
1088	Montane Oriole	●		●		●					●	●			
1100	Stuhlmann's Starling											●			
1101	Kenrick's Starling					●									
1102	Waller's Starling	●		●		●						●			
1105	Slender-billed Starling	●				●						●			
1122	Abbott's Starling	●		●		●		●	●						
1123	Sharpe's Starling	●		●		●		●	●			●			
1159	Northern Double-collared Sunbird	●		●		●					●	●			
1161	Eastern Double-collared Sunbird	●		●		●		●	●			●			
1177	Tacazze Sunbird	●				●						●			
1179	Bronze Sunbird	●	●	●		●	●		●		●	●	●	●	●
1180	Golden-winged Sunbird	●		●		●			●	●	●	●	●	●	●
1182	Scarlet-tufted Malachite Sunbird	●				●									
1205	Baglafecht Weaver	●	●	●		●	●	●	●	●	●	●	●	●	●
1211	Black-billed Weaver	●										●			
1240	Brown-capped Weaver	●		●		●					●	●			
1266	Jackson's Widowbird	●			●	●					●		●		●
1279	Abyssinian Crimson-wing	●		●		●			●		●	●			
1333	African Citril	●	●	●		●	●		●		●	●	●		●
1340	Streaky Seed-eater	●	●	●		●			●		●	●	●	●	●
1344	Thick-billed Seed-eater	●		●		●						●			
1349	Oriole Finch	●				●						●			
	Total species recorded	52	8	39	6	53	5	14	21	2	25	49	10	8	9

Masai Mara	Mau Forest Complex	Mau Narok/Mtelo Grasslands	North Nandi Forest	Ol Donyo Sabache	South Nandi Forest	South Ngurumaan	Kakamega Forest	Mt Elgon	Number sites recorded	OSc#	Common Name
50	51	52	53	54	55	56	58	59			
											(67 Kenyan species)
	●		●		●		●	●	11	950	Black-collared Apalis
									1	952.1	Taita Apalis
	●		●		●		●	●	10	967	White-browed Crombec
●		●	●			●	●	●	11	977	Brown Parisoma
									6	982	Montane White-eye
									1	982.1	Taita White-eye
									0	982.2	Kulal White-eye
	●		●		●		○	●	8	1002	White-tailed Crested Flycatcher
	●		●					●	6	1055	Doherty's Bush Shrike
●	●		●		●	●	●	●	13	1080	Grey Cuckoo Shrike
	●		●		●		○	●	9	1088	Montane Oriole
	●		●		●		●	○	5	1100	Stuhlmann's Starling
									1	1101	Kenrick's Starling
	●				●	●	●	●	9	1102	Waller's Starling
	●							○	4	1105	Slender-billed Starling
									5	1122	Abbott's Starling
●	●		●		●	●	○	●	12	1123	Sharpe's Starling
	●		●		●			●	9	1159	Northern Double-collared Sunbird
	●					●		○	8	1161	Eastern Double-collared Sunbird
	●	●						●	6	1177	Tacazze Sunbird
●	●	●	●		●	●	●	●	19	1179	Bronze Sunbird
○	●	●				●		●	14	1180	Golden-winged Sunbird
									2	1182	Scarlet-tufted Malachite Sunbird
●	●	●	●		●	●	●	●	21	1205	Baglafecht Weaver
●	●		●		●		●	●	8	1211	Black-billed Weaver
●	●		●		●	●	●	●	12	1240	Brown-capped Weaver
●	○	●				●			9	1266	Jackson's Widowbird
	●					●			8	1279	Abyssinian Crimson-wing
●	●		●		●	●	●	●	17	1333	African Citril
○	●	●	●		●	●	●	●	17	1340	Streaky Seed-eater
●	●		●		●	●	●	●	11	1344	Thick-billed Seed-eater
	●		●				●	●	8	1349	Oriole Finch
16	48	14	34	2	32	30	27	46	**Total species recorded**		

Appendix 3C
Biome species
East African Coast

OSc#	Common Name	7 Arabuko-Sokoke Forest	8 Dakatcha Woodland	9 Diani Forest	10 Dzombo Hill Forest	11 Gede Ruins National Mnmt.	12 Kaya Gandini	13 Kaya Wut	15 Kiunga Marine Natl. Res.	16 Mida Creek, Whale Island and Malindi/Watamu Coast	17 Marenji Forest	18 Mrima Hill Forest	19 Sabaki River Mouth	20 Shimba Hills
	(30 Kenyan species)													
113	Southern Banded Snake Eagle	●	●	●		●	●							●
382	Brown-headed Parrot	●	●		●		●				●			●
397	Fischer's Turaco	●	●	●	●	●	●	●			●	●		●
430	Sokoke Scops Owl	●												
489	Mangrove Kingfisher	●							●				●	●
559	Eastern Green Tinkerbird	●				●	●	●			●	●		●
576	Brown-breasted Barbet	●												●
604	Mombasa Woodpecker	●		●	●		●				●	●		●
686	Malindi Pipit												●	
692	Sokoke Pipit	●	●		●	○	●				●			●
712	Fischer's Greenbul	●		●	●	●					●	●		●
714	Northern Brownbul	●	●		●	●		●			●	●	●	●
720	Tiny Greenbul	●		●	●						●	●		●
741	Scaly Babbler	●							●	●				
763	East Coast Akalat	●												●
916	Tana River Cisticola													
949	White-winged Apalis													
987	Little Yellow Flycatcher	●		●		●					●	●		●
1014	Pale Batis	●	●											
1028	Chestnut-fronted Helmet-shrike	●			●	○	●				●	●		●
1056	Four-coloured Bush-shrike	●				●								
1090	Green-headed Oriole	○									●	●		●
1109	Black-bellied Starling	●	●	●	●	●	●				●	●		●
1132	Plain-backed Sunbird	●		●	●	●	●				●	●		●
1136	Uluguru Violet-backed Sunbird			●										●
1137	Amani Sunbird	●												
1144	Mouse-coloured Sunbird	●				●				●				
1167	Violet-breasted Sunbird	●								○				
1235	Clarke's Weaver	●	●											
1255	Zanzibar Red Bishop												●	
	Total species recorded	**24**	**8**	**9**	**10**	**10**	**9**	**3**	**2**	**2**	**13**	**11**	**4**	**18**

Taita Hills Forests	Tana River Delta	Tana River Forests	Bisanadi National Park	Bisanadi West National Park	Samburu/Buffalo Springs Nat. Reserves	Number sites recorded	OSc#	Common Name
21	22	23	24	25	33			
								(30 Kenyan species)
●	●	●				9	113	Southern Banded Snake Eagle
						6	382	Brown-headed Parrot
		●				11	397	Fischer's Turaco
						1	430	Sokoke Scops Owl
	●	●				6	489	Mangrove Kingfisher
						7	559	Eastern Green Tinkerbird
●	●	●	●			6	576	Brown-breasted Barbet
						7	604	Mombasa Woodpecker
	●	●				3	680	Malindi Pipit
						6	692	Sokoke Pipit
	●	●				9	712	Fischer's Greenbul
●	●	●	●	●	●	15	714	Northern Brownbul
						6	720	Tiny Greenbul
	●	●				5	741	Scaly Babbler
		●				3	763	East Coast Akalat
		○				0	916	Tana River Cisticola
		●				1	949	White-winged Apalis
		●				7	997	Little Yellow Flycatcher
	●	●				4	1014	Pale Batis
		●				7	1028	Chestnut-fronted Helmet-shrike
●	●	●		●		6	1056	Four-coloured Bush-shrike
						3	1089	Green-headed Oriole
	●	●			●	12	1109	Black-bellied Starling
		●				9	1132	Plain-backed Sunbird
		●				3	1136	Uluguru Violet-backed Sunbird
						1	1137	Amani Sunbird
	●	●				5	1144	Mouse-coloured Sunbird
	●	●				3	1167	Violet-breasted Sunbird
						2	1235	Clarke's Weaver
	●					2	1255	Zanzibar Red Bishop
4	13	19	2	2	2			**Total species recorded**

Appendix 3D
Biome species
Lake Victoria Basin

OSc#	Common Name	Dunga Swamp	Kogula Swamp	Kusa Swamp	Yala Swamp	Mt Elgon	Sio Port Swamp	Total sites recorded
	(9 Kenyan species)							
185	Ring-necked Francolin					●		1
738	Black-lored Babbler	●	●		●	●	●	5
882	White-winged Warbler	●	●	●	●		●	5
890	Papyrus Yellow Warbler	●	●		●			3
907	Carruthers's Cisticola	●	●	●	●		●	5
1066	Papyrus Gonolek	●	●	●	●		●	5
1170	Red-chested Sunbird	●	●	●	●		●	5
1219	Northern Brown-throated Weaver	●			●		●	3
1334	Papyrus Canary	●			●		●	3
	Total species recorded	8	6	4	8	2	7	

Appendix 3F
Biome species
Sudan and Guinea Savannah

OSc#	Common Name	Lake Turkana	Busia Grasslands	Mt Elgon	Total sites recorded
	(13 Kenyan species)				
174	Fox Kestrel	●			1
398	White-crested Turaco				0
608	Speckle-breasted Woodpecker		●	●	2
901	Foxy Cisticola			●	1
902	Red-pate Cisticola				0
1030	Yellow-billed Shrike			●	1
1092	Piapiac		●		1
1110	Purple Starling		●	●	2
1113	Bronze-tailed Starling				0
1198	Chestnut-crowned Sparrow Weaver				0
1225	Heuglin's Masked Weaver			●	1
1296	Black-bellied Firefinch		●		1
1302	Black-rumped Waxbill		●		1
	Total species recorded	1	5	5	

Appendix 3E
Biome species
Guinea—Congo Forests

OSc#	Common Name	Cherangani Hills	Mau Forest Complex	North Nandi Forest	South Nandi Forest	Busia Grasslands	Kakamega Forest	Mt Elgon	Total sites recorded
		43	51	54	55	57	58	59	
	(43 Kenyan species)								
208	White-spotted Flufftail			●	●		●		3
378	Grey Parrot						●		1
448	Red-chested Owlet		●	●	●		●	●	5
448	Black-shouldered Nightjar					●			1
464	Sabine's Spinetail						●	○	1
509	Blue-headed Bee-eater				●		●		2
550	Black-and-white-casqued Hornbill	●	●	●	●		●	●	5
566	Yellow-spotted Barbet		●	●	●		●	●	5
567	Hairy-breasted Barbet						●		1
580	Yellow-billed Barbet	●	●	●	●		●	●	6
618	Cassin's Honeybird						●		1
607	Buff-spotted Woodpecker				●		●	○	2
608	Brown-eared Woodpecker						●	○	1
614	Yellow-crested Woodpecker			●			●	●	3
698	Cameroon Sombre Greenbul			●	●		●	○	3
699	Little Grey Greenbul						●		1
700	Ansorge's Greenbul				●		●	○	2
710	Toro Olive Greenbul						●	○	1
723	Honeyguide Greenbul				●		●	○	2
730	Red-tailed Bristlebill			●	●		●	●	4
750	Brown Illadopsis						●		1
753	Scaly-breasted Illadopsis			●	●		●		3
773	Blue-shouldered Robin Chat			●	●		●	○	3
781	White-tailed Ant Thrush			●	●		●		3
874	Uganda Woodland Warbler			●	●		●		3
879	Green Hylia			●	●		●	●	4
934	Olive-green Camaroptera			●	●		●	○	3
942	Buff-throated Apalis			●	●		●	●	4
969	Green Crombec					●			1
973	Turner's Eremomela				●		●		2
988	Dusky Tit			●	●		●	○	3
1008	Red-bellied Paradise Flycatcher						●		1
1009	African Shrike Flycatcher			●	●		●		3
1021	Chestnut Wattle-eye				●		●		2
1022	Jameson's Wattle-eye			●	●		●		3
1051	Bocage's Bush Shrike			●	●		●		3
1078	Petit's Cuckoo Shrike			●	●		●		3
1089	Western Black-headed Oriole				●		●		2
1138	Green Sunbird		●	●	●		●	○	4
1148	Green-throated Sunbird			●	●		●		3
1183	Superb Sunbird					●			1
1233	Vieillot's Black Weaver			●	●		●		3
1246	Red-headed Malimbe						●		1
	Total species recorded	2	3	23	29	3	40	8	

Appendix 4
Kenyan sites meeting 1% criterion

OSc#	Common Name	Threshold	Kiunga Island	Kitanga Marine Natl. Res.	Mida Creek, Whale Island and Malindi/Watamu Coast	Sabaki River Mouth	Tana River Delta	Lake Turkana	Masinga Reservoir	Dandora Ponds	Nairobi National Park	Lake Bogoria National Reserve	Lake Elmenteita	Lake Magadi	Lake Naivasha	Lake Nakuru National Park
			14	15	16	19	22	28	30	35	36	45	46	47	48	49
34	Black-necked Grebe	250										●	●			●
5	Little Grebe	500													●	●
20	Great White Pelican	1,800					●						●			●
21	Pink-backed Pelican	1,000					●	●								
26	Great Cormorant	1,000							●							
37	Cattle Egret	10,000					●									
46	Yellow-billed Egret	1,000					●									
47	Great Egret	500					●									
59	African Open-billed Stork	1,000					●									
60	Yellow-billed Stork	500					●									●
67	African Spoonbill	150					●						●		●	●
68	Greater Flamingo	1,250					●	●				●	●			●
69	Lesser Flamingo	20,000										●	●	●		●
73	Spur-winged Goose	3,750					●									
89	Northern Shoveler	1,600								●						
90	Southern Pochard	500								●						
177	Lesser Kestrel	600									●					
227	Red-knobbed Coot	5,000													●	
244	Crab-plover	300		●	●											
246	Pied Avocet	250											●			
247	Black-winged Stilt	1,000														●
261	Madagascar Pratincole	50				●										
263	Ringed Plover	3,000						●								
265	Kittlitz s Plover	1,000						●								
270	White-fronted Plover	1,000					●									
271	Lesser Sandplover	250			●		●									
272	Greater Sandplover	650			●											
273	Caspian Plover	200						●								
279	Spur-winged Plover	5,000						●								
287	Little Stint	10,000					●	●								
293	Curlew Sandpiper	7,500					●									
310	Marsh Sandpiper	350					●									
322	Sooty Gull	400				●	●									
326	Grey-headed Gull	1,000														●
328	Slender-billed Gull	100					●									
330	Gull-billed Tern	270					●									●
331	Caspian Tern	250					●									
333	Lesser Crested Tern	250					●									
335	Roseate Tern	400	●	●	●											
341	Saunders s Tern	200			●	●	●									
343	Whiskered Tern	1,000					●									

Appendix 5

Summary of threatened bird species distribution used to calculate scores for category A1 for priority-setting purposes

(see ... and ... for details)

The number of species in each threat class is shown for each site

Table of Scores	Points
Critically Endangered	3
Endangered	2
Vulnerable, or Data Deficient	1
Near-threatened	0.5
Regionally threatened	0.1

		Critically Endangered	Endangered	Vulnerable	Near-threatened	Regionally threatened	Score
1	Aberdare Mountains	0	0	3	1	9	**4.4**
2	Kianyaga Valleys	0	1	0	0	0	**2.0**
3	Kikuyu Escarpment Forest	0	0	1	0	4	**1.4**
4	Kinangop Grasslands	0	0	2	2	1	**3.1**
5	Mt Kenya	0	0	3	1	8	**4.3**
6	Mukurweini Valleys	0	1	0	0	0	**2.0**
7	Arabuko-Sokoke Forest	0	1	3	3	3	**9.0**
8	Dakatcha Woodland	0	0	2	1	0	**2.5**
9	Diani Forest	0	1	0	2	3	**3.3**
10	Dzombo Hill Forest	0	0	1	2	1	**2.1**
11	Gede Ruins National Monument	0	1	0	3	3	**3.8**
12	Kaya Gandini	0	1	1	3	0	**4.5**
13	Kaya Waa	0	1	0	1	0	**2.5**
14	Kisite Island	0	0	0	0	1	**0.1**
15	Kiunga Marine National Reserve	0	0	0	0	2	**0.2**
16	Mida Creek, Whale Island & Malindi/Watamu Coast	0	0	0	0	2	**0.2**
17	Marenji Forest	0	0	1	2	1	**2.1**
18	Mrima Hill Forest	0	1	0	2	1	**3.1**
19	Sabaki River Mouth	0	0	0	1	2	**0.7**
20	Shimba Hills	0	1	2	3	5	**6.0**
21	Taita Hills Forests	3	0	2	1	2	**11.7**
22	Tana River Delta	0	0	0	3	4	**1.9**
23	Tana River Forests	0	0	2	4	10	**5.0**
24	Tsavo East National Park	0	0	1	2	7	**2.7**
25	Tsavo West National Park	0	0	2	3	10	**4.5**
26	Chyulu Hills Forests	0	0	1	0	3	**1.3**
27	Dida Galgalu Desert	0	0	0	1	0	**0.5**
28	Lake Turkana	0	0	0	1	5	**1.0**
29	Machakos Valleys	0	1	0	0	0	**2.0**
30	Masinga Reservoir	0	0	0	0	2	**0.2**
31	Meru National Park	0	0	0	0	4	**0.4**
32	Mwea National Reserve	0	0	0	1	3	**0.8**
33	Samburu/Buffalo Springs National Reserves	0	0	2	0	5	**2.5**
34	Shaba National Reserve	0	0	1	0	5	**1.5**
35	Dandora Ponds	0	0	0	0	1	**0.1**
36	Nairobi National Park	0	0	2	3	10	**4.5**
37	Dunga Swamp	0	0	1	1	5	**1.5**
38	Koguta Swamp	0	0	1	1	5	**1.5**
39	Kusa Swamp	0	0	0	1	2	**0.5**
40	Ruma National Park	0	0	1	0	5	**1.0**
41	Yala Swamp	0	0	1	2	2	**2.2**
42	Amboseli National Park	0	0	1	2	6	**2.6**
43	Cherangani Hills	0	0	0	0	5	**0.5**
44	Lake Baringo	0	0	1	1	4	**1.9**
45	Lake Bogoria National Reserve	0	0	1	3	6	**3.1**
46	Lake Elmenteita	0	0	2	2	8	**3.8**
47	Lake Magadi	0	0	0	1	1	**0.6**
48	Lake Naivasha	0	0	1	1	6	**2.1**
49	Lake Nakuru National Park	0	0	2	3	6	**4.1**
50	Masai Mara	0	0	3	4	10	**6.0**
51	Mau Forest Complex	0	0	0	0	8	**0.8**
52	Mau Narok/Molo Grasslands	0	0	3	3	1	**4.6**
53	North Nandi Forest	0	0	1	0	8	**1.8**
54	Ol Donyo Sabache	0	0	1	0	3	**1.3**
55	South Nandi Forest	0	0	1	0	8	**1.8**
56	South Nguruman	0	0	1	2	3	**2.3**
57	Busia Grasslands	0	0	1	1	2	**1.7**
58	Kakamega Forest	0	0	2	0	15	**3.5**
59	Mt Elgon	0	0	1	0	8	**1.8**
60	Sio Port Swamp	0	0	0	1	0	**0.5**

Appendix 6
Bird importance scores

		Threatened birds points (see Appendix 5)	Category A1 score	No. restricted-range birds	Category A2 score	% Somali—Masai biome	% Afrotropical Highlands biome	% East African Coast biome	% Lake Victoria Basin biome	% Guinea-Congo Forests biome
1	Aberdare Mountains	4.4	4	6	4	0	78	0	0	0
2	Kianyaga Valleys	2	2	1	1	3	12	0	0	0
3	Kikuyu Escarpment Forest	1.4	1	3	3	0	58	0	0	0
4	Kinangop Grasslands	4.1	4	2	2	0	9	0	0	0
5	Mt Kenya	4.3	4	6	4	0	79	0	0	0
6	Mukurweini Valleys	2	2	1	1	3	7	0	0	0
7	Arabuko-Sokoke Forest	9	4	5	4	0	0	80	0	0
8	Dakatcha Woodland	2.5	2	3	3	0	0	27	0	0
9	Diani Forest	3.5	3	1	1	0	0	30	0	0
10	Dzombo Hill Forest	2.1	2	2	2	0	0	33	0	0
11	Gede Ruins National Monument	3.8	3	2	2	0	0	33	0	0
12	Kaya Gandini	4.5	4	2	2	0	0	30	0	0
13	Kaya Waa	2.5	2	1	1	0	0	10	0	0
14	Kisite Island	0.3	0	1	0	0	0	0	0	0
15	Kiunga Marine National Reserve	0.2	0	0	0	0	0	7	0	0
16	Mida Creek, Whale Island & Malindi/Watamu Coast	0.2	0	1	0	0	0	7	0	0
17	Marenji Forest	2.1	2	2	2	0	0	33	0	0
18	Mrima Hill Forest	3.1	3	1	1	0	0	37	0	0
19	Sabaki River Mouth	0.7	0	0	0	0	0	13	0	0
20	Shimba Hills	6	4	2	2	0	0	60	0	0
21	Taita Hills Forests	11.7	4	3	3	0	21	13	0	0
22	Tana River Delta	1.9	1	0	0	24	0	43	0	0
23	Tana River Forests	5	4	3	3	17	0	67	0	0
24	Tsavo East National Park	2.7	2	0	0	63	0	7	0	0
25	Tsavo West National Park	4.5	4	0	0	60	0	7	0	0
26	Chyulu Hills Forests	1.3	1	1	1	9	31	0	0	0
27	Dida Galgalu Desert	0.5	0	1	1	48	0	0	0	0
28	Lake Turkana	1	1	0	0	37	0	0	0	0
29	Machakos Valleys	2	2	1	1	20	3	0	0	0
30	Masinga Reservoir	0.2	0	0	0	1	0	0	0	0
31	Meru National Park	0.4	0	0	0	62	0	0	0	0
32	Mwea National Reserve	0.8	0	0	0	15	0	0	0	0
33	Samburu/Buffalo Springs National Reserves	2.3	2	0	0	66	0	7	0	0
34	Shaba National Reserve	1.5	1	1	1	68	0	0	0	0

...Sudan and Guinean Savannah biome	Highest % biome	Category A3 score	Highest multiple of threshold	Category A4 score (a)	No. congregatory spp. listed	Category A4 score (b)	Mean Category A4 score	Overall score	Overall bird importance (1–4)		
0	78	4	0.0	0	0	0	0.0	12.0	4	1	Aberdare Mountains
0	12	0	0.0	0	0	0	0.0	3.0	2	2	Kianyaga Valleys
0	38	3	0.0	0	0	0	0.0	7.0	4	3	Kikuyu Escarpment Forest
0	0	0	0.0	0	0	0	0.0	0.0	3	4	Kinangop Grasslands
0	79	4	0.0	0	0	0	0.0	12.0	4	5	Mt Kenya
0	1	0	0.0	0	0	0	0.0	3.0	2	6	Mukurweini Valleys
0	80	4	0.0	0	0	0	0.0	12.0	4	7	Arabuko-Sokoke Forest
0	27	1	0.0	0	0	0	0.0	6.0	3	8	Dakatcha Woodland
0	30	1	0.0	0	0	0	0.0	5.0	3	9	Diani Forest
0	33	1	0.0	0	0	0	0.0	5.0	3	10	Dzombo Hill Forest
0	33	1	0.0	0	0	0	0.0	6.0	3	11	Gede Ruins National Monument
0	70	1	0.0	0	0	0	0.0	7.0	4	12	Kaya Gandini
0	10	0	0.0	0	0	0	0.0	3.0	2	13	Kaya Waa
0	0	0	2.5	1	1	1	1.0	1.0	1	14	Kisite Island
0	7	0	12.5	3	2	2	2.5	2.5	1	15	Kiunga Marine National Reserve
0	7	0	28.5	4	3	4	4.0	4.0	2	16	Mida Creek, Whale Island & Malindi/Watamu Coast
0	43	2	0.0	0	0	0	0.0	6.0	3	17	Marenji Forest
0	37	2	0.0	0	0	0	0.0	6.0	3	18	Mrima Hill Forest
0	13	0	50.0	4	4	4	4.0	4.0	2	19	Sabaki River Mouth
0	60	3	0.0	0	0	0	0.0	9.0	4	20	Shimba Hills
0	21	1	0.0	0	0	0	0.0	8.0	4	21	Taita Hills Forests
0	45	2	24.5	4	22	4	4.0	7.0	4	22	Tana River Delta
0	67	3	0.0	0	0	0	0.0	10.0	4	23	Tana River Forests
0	65	3	0.0	0	0	0	0.0	5.0	2	24	Tsavo East National Park
0	60	3	0.0	0	0	0	0.0	7.0	4	25	Tsavo West National Park
0	31	1	0.0	0	0	0	0.0	3.0	1	26	Chyulu Hills Forests
0	48	2	0.0	0	0	0	0.0	3.0	1	27	Dida Galgalu Desert
8	37	2	31.3	3	7	4	3.5	6.5	3	28	Lake Turkana
0	20	1	0.0	0	0	0	0.0	4.0	2	29	Machakos Valleys
0	4	0	2.2	1	2	2	1.5	1.5	1	30	Masinga Reservoir
0	62	3	0.0	0	0	0	0.0	3.0	2	31	Meru National Park
0	16	0	0.0	0	0	0	0.0	0.0	1	32	Mwea National Reserve
0	66	3	0.0	0	0	0	0.0	5.0	3	33	Samburu/Buffalo Springs National Reserves
0	68	4	0.0	0	0	0	0.0	6.0	3	34	Shaba National Reserve

Appendix 6
Bird importance scores

		Threatened birds points (*see Appendix 5*)	Category A1 score	No. restricted-range birds	Category A2 score	% Somali—Masai biome	% Afrotropical Highlands biome	% East African Coast biome	% Lake Victoria Basin biome	% Guinea-Congo Forests biome
35	Dandora Ponds	0.1	0	0	0	0	0	0	0	0
36	Nairobi National Park	4.5	4	1	1	25	37	0	0	0
37	Dunga Swamp	1.5	1	0	0	0	0	0	89	0
38	Koguta Swamp	1.5	1	0	0	0	0	0	67	0
39	Kusa Swamp	0.5	0	0	0	0	0	0	44	0
40	Ruma National Park	1	1	0	0	0	0	0	0	0
41	Yala Swamp	2.2	2	0	0	0	0	0	89	0
42	Amboseli National Park	2.6	2	0	0	46	0	0	0	0
43	Cherangani Hills	0.8	0	1	1	0	73	0	0	5
44	Lake Baringo	1.9	1	0	0	38	0	0	0	0
45	Lake Bogoria National Reserve	3.1	3	0	0	34	0	0	0	0
46	Lake Elmenteita	3.8	3	2	2	4	53	0	0	0
47	Lake Magadi	0.6	0	0	0	30	0	0	0	0
48	Lake Naivasha	2.1	2	1	1	2	12	0	0	0
49	Lake Nakuru National Park	4.1	4	1	1	11	13	0	0	0
50	Masai Mara	6	4	3	3	18	24	0	0	0
51	Mau Forest Complex	0.8	0	2	2	0	72	0	0	12
52	Mau Narok/Molo Grasslands	4.6	4	4	4	0	21	0	0	0
53	North Nandi Forest	1.8	1	1	1	0	31	0	0	33
54	Ol Donyo Sabache	1.3	1	1	1	21	4	4	0	0
55	South Nandi Forest	1.8	1	0	0	0	48	0	0	67
56	South Nguruman	2.3	2	3	3	29	45	0	0	0
57	Busia Grasslands	1.7	1	0	0	0	0	0	0	0
58	Kakamega Forest	3.8	3	1	1	0	40	0	0	93
59	Mt Elgon	1.8	1	3	3	2	69	0	22	19
60	Sio Port Swamp	0.5	0	0	0	0	0	0	78	0

W. Sudan and Guinea Savannah biome	Highest % biome	Category A3 score	Highest multiple of threshold	Category A4 score (a)	No. congregatory spp. listed	Category A4 score (b)	Mean Category A4 score	Overall score	Overall bird importance (1–4)		
0	0	0	0.4	2	2	2	2.0	2.0	1	35	Dandora Ponds
0	37	2	8.3	3	1	1	2.0	9.0	4	36	Nairobi National Park
0	89	4	0.0	0	0	0	0.0	5.0	3	37	Dunga Swamp
0	67	3	0.0	0	0	0	0.0	4.0	2	38	Koguta Swamp
0	44	2	0.0	0	0	0	0.0	2.0	1	39	Kusa Swamp
0	0	0	0.0	0	0	0	0.0	1.0	1	40	Ruma National Park
0	89	4	0.0	0	0	0	0.0	6.0	3	41	Yala Swamp
0	46	2	0.0	0	0	0	0.0	4.0	2	42	Amboseli National Park
0	73	4	0.0	0	0	0	0.0	5.0	3	43	Cherangani Hills
0	38	2	0.0	0	0	0	0.0	3.0	2	44	Lake Baringo
0	34	1	75.0	4	3	3	3.5	7.5	4	45	Lake Bogoria National Reserve
0	15	0	22.3	4	4	4	4.0	9.0	4	46	Lake Elmenteita
0	30	1	2.5	1	1	1	1.0	2.0	1	47	Lake Magadi
0	12	0	3.9	2	3	0	1.0	4.0	2	48	Lake Naivasha
0	13	0	72.1	4	8	4	4.0	9.0	4	49	Lake Nakuru National Park
0	24	1	0.0	0	0	0	0.0	8.0	4	50	Masai Mara
0	72	4	0.0	0	0	0	0.0	6.0	3	51	Mau Forest Complex
0	23	1	0.0	0	0	0	0.0	9.0	4	52	Mau Narok/Molo Grasslands
0	53	4	0.0	0	0	0	0.0	6.0	3	53	North Nandi Forest
0	21	1	0.0	0	0	0	0.0	3.0	2	54	Ol Donyo Sabache
0	67	4	0.0	0	0	0	0.0	3.0	3	55	South Nandi Forest
0	45	2	0.0	0	0	0	0.0	7.0	4	56	South Ngurumon
38	38	2	0.0	0	0	0	0.0	3.0	2	57	Busia Grasslands
0	93	4	0.0	0	0	0	0.0	8.0	4	58	Kakamega Forest
38	69	4	0.0	0	0	0	0.0	8.0	4	59	Mt Elgon
0	78	4	0.0	0	0	0	0.0	4.0	2	60	Sio Port Swamp

7 INDICES

Index 1

Bird species in the site accounts and appendices, indexed by scientific name

Nomenclature follows OS-c (1996).
Numbers refer to IBA or (if prefixed by 'A') appendix numbers, not page numbers

Index of bird species: scientific names

Index 2

Bird species in the site accounts and appendices, indexed by English name

Nomenclature follows OS-c (1996).
Numbers refer to IBA or (if prefixed by 'A') appendix numbers, not page numbers

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Index of other animals and plants

Index 4A

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What is BirdLife International?

Over 1,200 bird species across the world are currently under threat of extinction in some way – over 12% of the world's birds. BirdLife International is a worldwide Partnership of conservation organisations that seeks to conserve all wild bird species and their habitats. Through this work, BirdLife strives to protect the world's biological diversity and supports the sustainable use by humans of the world's natural resources. BirdLife is a national force in 64 countries around the world and is represented in a further 27 nations.

BirdLife aims to:

- Prevent the extinction of any bird species
- Reduce the number of species that are globally threatened
- Enhance the conservation status of all bird species
- Conserve crucial sites and habitats for birds

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- Identifying priorities for bird and biodiversity conservation through scientific research and data collection
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BirdLife is now the world's leading authority on the status of the world's birds, their habitats and the urgent problems that face them.

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BirdLife International is a UK registered charity no. 1042125

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This book is a contribution to identifying Kenya's biodiversity conservation priorities. It describes in detail 60 sites in Kenya that meet the criteria for Important Bird Areas (IBAs) – places of global significance for bird and biodiversity conservation.

Important Bird Areas in Kenya will interest environmental planners, policy makers, wildlife managers, students and researchers. It will also be an essential source of information for birdwatchers wanting to locate Kenya's special birds.

This Kenya IBA directory is a joint project of

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