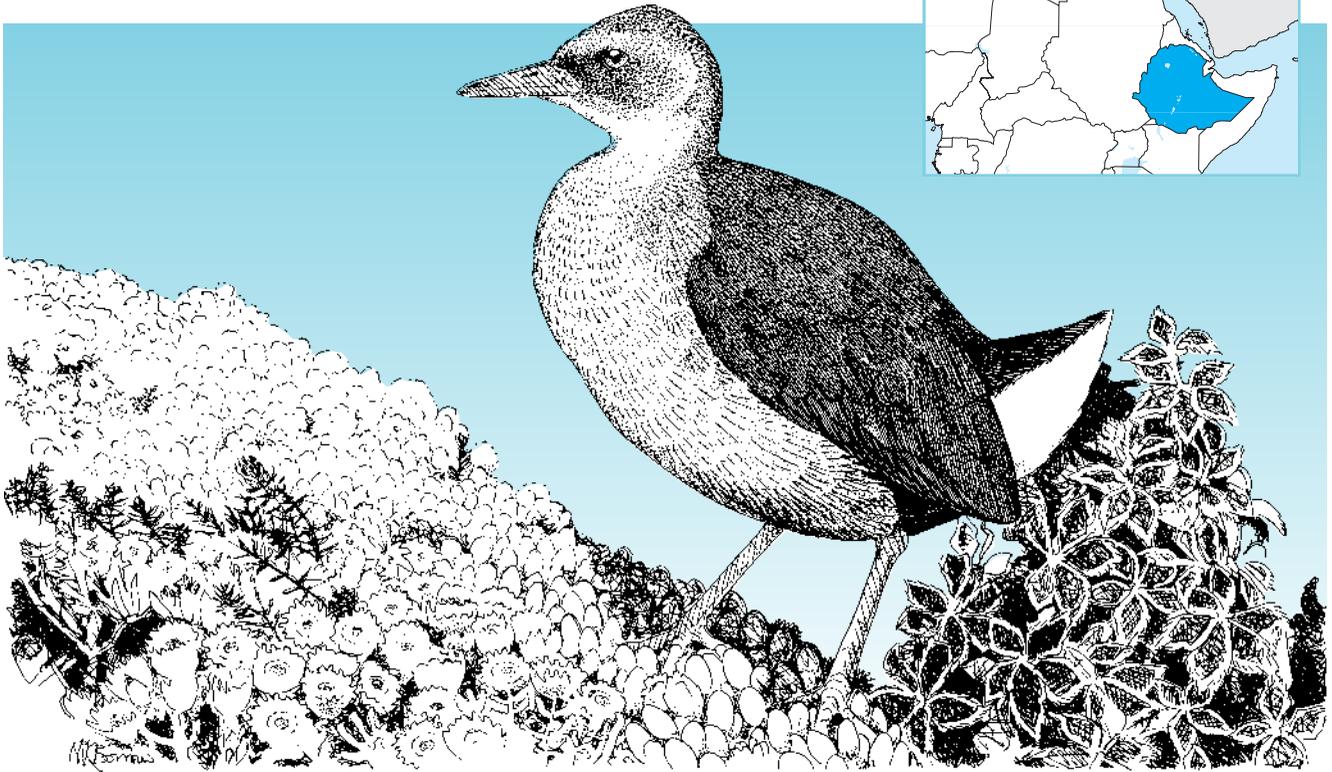


ETHIOPIA

ETHIOPIAN WILDLIFE AND NATURAL HISTORY SOCIETY



Rouget's Rail *Rougetius rougetii*. (ILLUSTRATION: NIK BORROW)

GENERAL INTRODUCTION

The Federal Democratic Republic of Ethiopia is located between 03°N and 15°N, and 33°E and 48°E, and occupies some 1,104,300 km². It is bordered by Sudan to the west, Eritrea and Djibouti to the north-east, Somalia to the east and Kenya to the south. It is a land of great geographical diversity, characterized primarily by variations in altitude. Elevations range from 116 m below sea-level in the Afar depression, to a number of peaks in excess of 4,000 m, of which the highest is Ras Dejen, rising to 4,620 m, in the Simen mountains. Much of the country comprises highland plateaus and mountain ranges that are dissected by numerous streams and rivers. There is a greater area of land above 1,500 m in Ethiopia than in any other African country. The Great Rift Valley divides the mountainous topography of the country into two main blocks, the western and northern highlands, and the south-eastern and eastern highlands. These highlands gradually descend to lowland areas in the east, west and south of the country. The principal rivers are the Abbay or Blue Nile, the Wabi Shebeelle, the Genale–Dawa–Weyb system, the Awash, the Tekezze–Angereb system, the Omo–Gibe system and the Baro–Akobo system. The source of the Abbay is Lake Tana in the north-west of the country; there is also a series of large lakes in the floor of the Rift Valley.

Ethiopia has five climatic zones, defined by altitude and temperature. The hot, arid zone covers the desert lowlands below 500 m, where average annual rainfall is less than 400 mm and average annual temperatures range between 28°C and 34°C or higher. The warm to hot, semi-arid zone includes those areas with an altitude of 500–1,500 m, average annual rainfall generally of around 600 mm (but as high as 1,600 mm in the western lowlands of Gambella), and an average annual temperature range of 20–28°C. The warm to cool, semi-humid zone covers the temperate highlands between 1,500 and 2,500 m. Average annual temperatures vary between 16°C and 20°C, and annual rainfall is generally around 1,200 mm, reaching 2,400 mm in the south-west. The cool to cold humid zone includes the temperate highlands between 2,500 and

3,200 m, where average temperatures range between 10°C and 16°C, with an annual rainfall of c. 1,000 mm and up to 2,000 mm in higher areas. The cold, moist temperate zone covers the Afro-alpine areas on the highest plateaus between 3,200 and 3,500 m; average temperatures are below 10°C and annual rainfall averages less than 800 mm.

The vegetation in Ethiopia can be divided into eight major types:

- Desert and semi-desert scrubland: characterized by highly drought-tolerant woody plants such as *Acacia*, *Commiphora*, *Boscia*, *Cadaba*, *Maerua* and *Zizyphus* spp., succulent species of *Euphorbia* and *Aloe*, and grasses including *Dactyloctenium aegyptium* and *Panicum turgidum*.
- Small-leaved, deciduous woodland of *Acacia–Commiphora*: drought-tolerant tree species and shrubs, with either small deciduous leaves or leathery, persistent ones characterize this vegetation-type and typical species include *Acacia tortilis*, *A. mellifera* and *Balanites aegyptiaca* together with various species of *Commiphora*, *Capparis*, *Combretum* and *Terminalia*. The ground layer includes the herbs *Acalypha* and *Barleria* spp.
- Moist evergreen forest: this vegetation-type is characterized by tall and medium-sized emergents, and understorey shrubs. Emergents include *Aningeria adolfi-friedericii*, *Albizia gummifera*, *A. grandeabracteata*, *Macaranga capensis* and *Ocotea kenyensis*. Typical understorey shrubs include *Chionanthus mildbraedii* and *Psychotria orophila*.
- Lowland semi-evergreen forest: characterized by a range of mainly semi-deciduous tree and shrub species. Woody species include the emergent trees *Celtis toka*, *Diospyros abyssinica*, *Malacantha alnifolia* and *Zanha gologensis*, while shrubby species include *Alchornea laxiflora*, *Oncoba spinosa* and *Whitfieldia elongata*.
- Broadleaved, deciduous woodland of *Combretum–Terminalia*: tree species in these woodlands are small in size with fairly large deciduous leaves and an understorey of herbs and grasses. The dominant trees and shrubs are *Combretum* and *Terminalia* spp., *Boswellia papyrifera*, *Lannea schimperi*, *Anogeissus leiocarpus*

Map 1. Location and size of Important Bird Areas in Ethiopia.

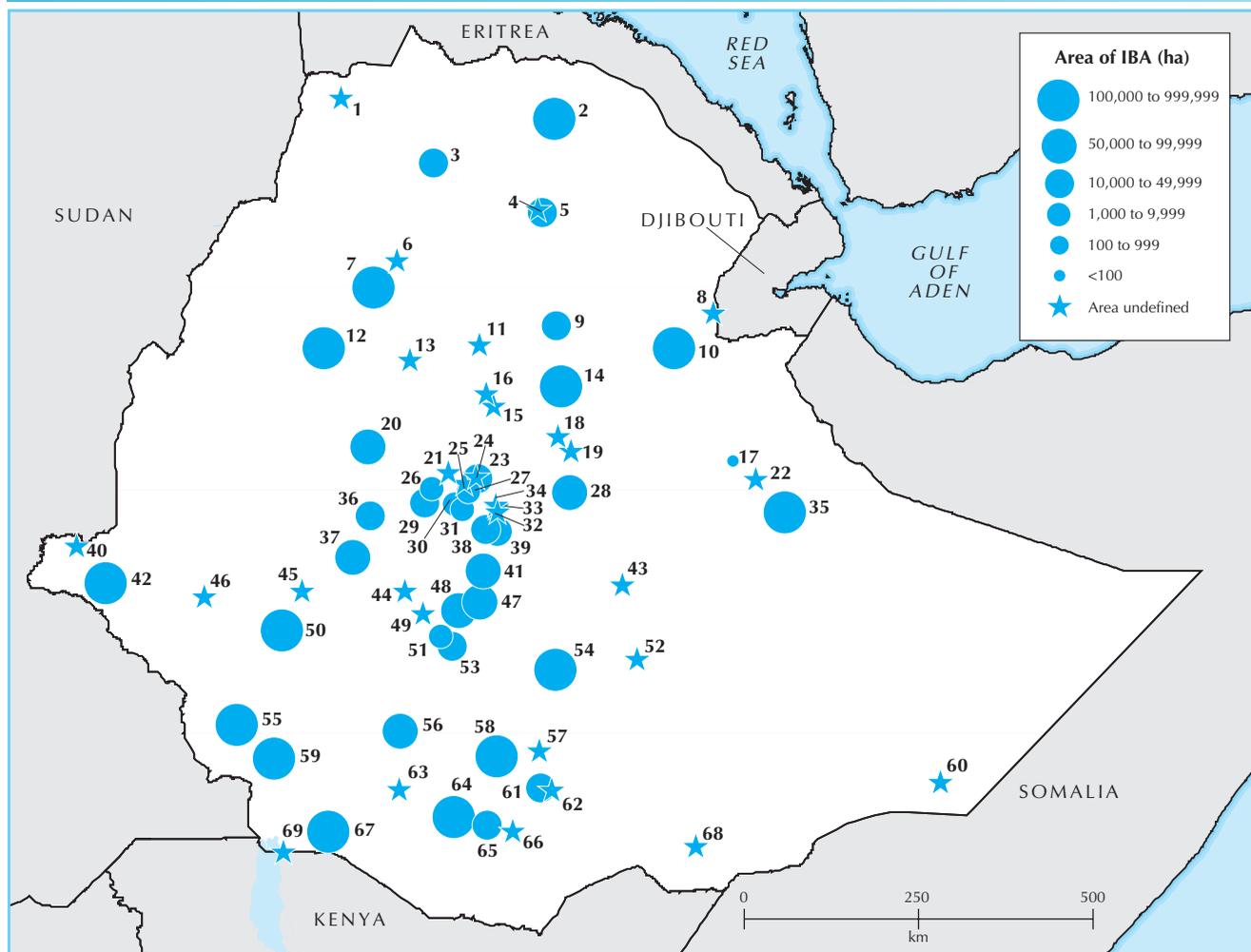


Table 1. Summary of Important Bird Areas in Ethiopia.

69 IBAs covering at least 47,757 km² (the areas of 29 sites are undefined)

IBA code	National code ¹	Site name	Administrative region	Criteria (see p. 11; for A2/3 codes, see Tables 2/3)									
				A1	A2 113	A2 114	A2 115	s063	A3 A04	A3 A07	A3 A08	A4i	A4iii
ET001	58	Shire lowlands in the Tekeze valley	Tigray								✓		
ET002	28	Dessa'a forest	Tigray	✓							✓		
ET003	59	Simen Mountains National Park	Amhara	✓			✓				✓		
ET004	9	Lake Ashenge	Tigray	✓									✓
ET005	41	Hugumburda and Grat-Kahsu forests	Tigray								✓		
ET006	34	Fogera plains	Amhara	✓									
ET007	15	Bahir Dar–Lake Tana	Amhara	✓							✓		✓
ET008	1	Lake Abe wetland system	Afar	✓									✓
ET009	66	Yegof forest	Amhara								✓		
ET010	65	Yangudi-Rassa National Park	Afar	✓								✓	
ET011	—	Denkoro forest	Amhara								✓		
ET012	13	Awı Zone	Amhara	✓							✓		
ET013	26	Choke mountains	Amhara	✓							✓		
ET014	40	Guassa (Menz)	Amhara	✓							✓		✓
ET015	42	Jemma and Jara valleys	Amhara	✓				✓		✓			
ET016	53	Mid-Abbay (Blue Nile) river basin	Amhara, Oromiya	✓			✓						
ET017	4	Lakes Alemaya and Adele	Oromiya										✓
ET018	7	Ankober–Debre Sina escarpment	Amhara	✓			✓				✓		
ET019	5	Aliyu Amba–Dulecha	Amhara, Afar	✓			✓						
ET020	33	Finchaa and Chomen swamps	Oromiya	✓							✓		
ET021	—	Berga flood-plain	Oromiya	✓							✓		✓
ET022	20	Bisidimo	Oromiya	✓									
ET023	32	Entoto Natural Park and escarpment	Addis Ababa								✓		
ET024	61	Sululta plain	Oromiya	✓							✓		✓
ET025	—	Gudo plain	Oromiya	✓							✓		✓
ET026	—	Chilimo forest	Oromiya								✓		

Table 1 ... continued. Summary of Important Bird Areas in Ethiopia. 69 IBAs covering at least 47,757 km² (the areas of 29 sites are undefined)

IBA code	National code ¹	Site name	Administrative region	Criteria (see p. 11; for A2/3 codes, see Tables 2/3)									
				A1	A2				A3		A4i	A4iii	
					113	114	115	s063	A04	A07	A08		
ET027	36	Gefersa reservoir	Addis Ababa	✓						✓		✓	
ET028	11	Awash National Park	Oromiya, Afar	✓			✓	✓			✓		
ET029	3	Akaki–Aba–Samuel wetlands	Oromiya	✓								✓	✓
ET030	29	Dilu Meda (Tefki)	Oromiya	✓									
ET031	51	Menagesha State Forest	Oromiya							✓			
ET032	19	Bishoftu lake	Oromiya	✓									
ET033	24	Chelekleka lake and swamp	Oromiya	✓								✓	✓
ET034	38	Green Lake	Oromiya	✓								✓	✓
ET035	14	Babille Elephant Sanctuary	Oromiya								✓		
ET036	—	Jibat forest	Oromiya	✓						✓			
ET037	62	Tiro Boter–Becho forest	Oromiya	✓						✓			
ET038	69	Mount Zuquala	Oromiya							✓			
ET039	44	Koka dam and Lake Gelila	Oromiya	✓								✓	✓
ET040	17	Baro river	Gambella	✓								✓	✓
ET041	68	Lake Zeway	Oromiya										✓
ET042	35	Gambella National Park	Gambella	✓					✓				
ET043	60b	Shek Husein	Oromiya	✓									
ET044	54	Mugo highlands	Southern Peoples' Region	✓			✓			✓			
ET045	43	Koffe swamp	Oromiya	✓									
ET046	52	Metu–Gore–Tepi forests	Oromiya	✓						✓			
ET047	46	Lake Langano	Oromiya	✓									
ET048	2	Abijatta–Shalla Lakes National Park	Oromiya	✓							✓	✓	✓
ET049	23	Boyo wetland	Southern Peoples' Region	✓									✓
ET050	22	Bonga forest	Southern Peoples' Region							✓			
ET051	—	Senkele Sanctuary	Oromiya	✓									
ET052	60a	Sof Omar	Oromiya	✓							✓		
ET053	10	Lake Awassa	Southern Peoples' Region									✓	✓
ET054	16	Bale Mountains National Park	Oromiya	✓						✓		✓	
ET055	57	Omo National Park	Southern Peoples' Region								✓		
ET056	55	Nechisar National Park	Southern Peoples' Region	✓		✓			✓		✓		
ET057	37	Genale river	Oromiya	✓	✓	✓					✓		
ET058	6	Anferara forests	Oromiya	✓		✓							
ET059	56	Mago National Park	Southern Peoples' Region						✓		✓		
ET060	48	Lower Wabi Shebelle river and Warder	Somali	✓	✓							✓	
ET061	49	Mankubsa–Welenso forest	Oromiya	✓		✓						✓	
ET062	47	Liben plains and Negele woodlands	Oromiya	✓		✓						✓	
ET063	45	Konso–Segen	Southern Peoples' Region	✓								✓	
ET064	64	Yabello Sanctuary	Oromiya	✓		✓						✓	
ET065	8	Arero forest	Oromiya	✓		✓						✓	
ET066	27	Dawa–Wachile	Oromiya	✓	✓							✓	
ET067	25	Lake Chew Bahir	Southern Peoples' Region, Oromiya	✓								✓	✓
ET068	21	Bogol Manyo–Dolo	Somali	✓	✓							✓	
ET069	63	Lake Turkana and Omo delta	Southern Peoples' Region									✓	✓
Total number of IBAs qualifying:				53	4	7	7	1	5	26	18	17	13

1. IBA code used in *Important Bird Areas in Ethiopia: a first inventory*. (1996) Ethiopian Wildlife and Natural History Society. EWNHS, Addis Ababa, Ethiopia.

and *Stereospermum kunthianum*; the bamboo *Oxytenanthera abyssinica* is prominent in western river valleys. The grasses are dominated by species of *Cymbopogon*, *Hyparrhenia*, *Echinochloa*, *Sorghum* and *Pennisetum*.

- Dry evergreen montane forest and grassland complex: this type is characterized by trees of various sizes and extensive grasslands that are rich in legumes. Common tree species include *Juniperus procera*, *Olea europaea*, *Celtis africana*, *Euphorbia ampliphylla*, *Mimusops kummel* and *Ekebergia capensis*. Typical shrubs include *Dracaena* spp., *Carissa edulis* and *Rosa abyssinica*, while common grass species belong to the genera *Hyparrhenia*, *Eragrostis*, *Panicum*, *Sporobolus*, *Eleusine* and *Pennisetum*, and the legumes include *Trifolium*, *Eriosema* and *Crotalaria* spp. The forest–grassland ecotone is occupied by *Acacia* woodland with *A. abyssinica*, *A. negrii* and *A. pilispina* the commonest trees.
- Afro-alpine and sub-Afro-alpine vegetation: this vegetation-type is characterized by small trees, shrubs and shrubby herbs at lower altitudes and, at higher altitudes, herbs and tuussock-forming grasses. Typical tree and shrub species include *Erica arborea*, *E. trimera* and *Hypericum revolutum*. Among herbs in this zone

are the giant lobelia *Lobelia rhynchopetalum*, *Kniphofia foliosa*, *Bartsia petitiana* and various *Alchemilla* species. *Festuca*, *Poa* and *Agrostis* spp. are typical grasses.

- Riparian and swamp vegetation: typical tree species include *Celtis africana*, *Ficus sycamorus*, *Mimusops kummel*, *Tamarindus indica*, *Maytenus senegalensis*, *Acacia* spp., *Kigelia aethiopicum* and *Syzygium guineense*. Swamps are dominated by sedges (especially species of *Eleocharis* and *Scirpus*), grasses (particularly *Echinochloa* spp.) and many herbs.

The human population of Ethiopia, which includes 81 indigenous ethnic groups, was estimated to be 60,148,000 (1997 UN estimate), of which just 15% live in urban areas. Ethiopia is divided into 14 administrative regions that have legislative, executive and judicial powers. Coffee is Ethiopia's major cash-crop, grown mostly in the southern and south-western parts of the country. Agriculture in the highlands is based largely on the production of barley, wheat and teff (*Eragrostis tef*), whereas in the arid areas of the country, especially in the extreme south, the south-east, east and north-east, pastoralism is the major activity.

Ethiopia, like a number of African countries, is experiencing serious environmental problems as a result of deforestation, overgrazing, agricultural encroachment and the unregulated use of agrochemicals. In addition, the country is facing recurrent drought (approximately every seven years) which claims millions of human lives. Arable land, especially in the highlands, is over-utilized, and the lack of soil-conservation schemes has resulted in a serious decline in agricultural output. This in turn is forcing farmers to exploit land on which the few remaining forests and woodlands persist, primarily within government reserves. Most of the country's National Parks are in the lowlands where grazing land is becoming scarce due to overgrazing and clearance for agriculture. Wildlife in such areas is considered to be in direct competition with humans and their cattle. Pastoralists try to eliminate the wildlife whenever the opportunity arises, such as during the change in government in 1991. This problem is further exacerbated by the government's reluctance to recognize officially, and gazette, all nine National Parks, rather than just two.

ORNITHOLOGICAL IMPORTANCE

Some 816 species of bird have been recorded from Ethiopia, of which at least 596 are resident and 224 are regular seasonal migrants, including 176 from the Palearctic. Sixteen species are endemic to Ethiopia and a further 13 are shared only with Eritrea. Thirty-one species of global conservation concern have been recorded. Of these, five (*Sarothrura ayresii*, *Tauraco ruspolii*, *Heteromirafra sidamoensis*, *Serinus flavigula*, *Serinus ankoberensis*) are classified as Endangered, 12 as Vulnerable (*Aythya nyroca*, *Aquila clanga*, *A. heliaca*, *Falco naumanni*, *F. fasciinucha*, *Francolinus harwoodi*, *Grus carunculatus*, *Crex crex*, *Mirafra degodiensis*, *Hirundo megaensis*, *Serinus xantholaema*, *Zavattariornis stresemanni*) and 14 are Near Threatened (*Balaeniceps rex*, *Phoenicopterus minor*, *Circus macrourus*, *Rougetius rougetii*, *Eupodotis humilis*, *Gallinago media*, *Glareola nordmanni*, *Streptopelia reichenowi*, *Mirafra pulpa*, *Macronyx flavicollis*, *Cercomela dubia*, *Acrocephalus griseldis*,

Sylvietta philippae and *Emberiza cineracea*; of these, *A. nyroca*, *A. clanga*, *A. heliaca*, *F. naumanni*, *C. crex*, *C. macrourus*, *G. media*, *G. nordmanni* and *A. griseldis* are non-breeding migrants from the Palearctic while *Phoenicopterus minor* is a non-breeding visitor from elsewhere in the Afrotropics; the remainder are resident).

Parts or all of three Endemic Bird Areas (EBAs) lie within Ethiopia. The Jubba and Shabeelle valleys EBA (EBA 113) is shared with Somalia and three of its four species occur, the whole of the South Ethiopian highlands EBA (EBA 114) falls within its borders (all five species occur) while most of the Central Ethiopian highlands EBA (EBA 115) does so and all its four species occur (see Table 2). There is also one Secondary Area—Northern Ethiopia (s063), defined by the distribution of *Cercomela dubia*.

Parts of four biome-restricted assemblages are present. These are: the Sahel biome (A03), in a small area of the far north (eight of the 16 species that are restricted to this biome have been recorded in Ethiopia); the Sudan–Guinea Savanna biome (A04) which occupies much of the west of the country (16 of its 54 species have been recorded); the Afrotropical Highlands biome (A07) which straddles large parts of the centre of Ethiopia (49 species in Ethiopia); and, across the east and remaining central parts, the Somali–Masai biome (A08; 98 species occur).

There are numerous wetlands of importance for birds. These include the lakes of the Rift Valley and, elsewhere, montane marshes and bogs and, particularly in the west, lowland swamps.

CONSERVATION INFRASTRUCTURE AND PROTECTED-AREA SYSTEM

The designation and management of protected areas used to be the sole mandate of the Ethiopian Wildlife Conservation Organization (EWCO), while the management of the priority forest areas was the responsibility of the Ministry of Agriculture's Forestry Department. However, excepting Awash and Yangudi Rasa National Parks, EWCO currently has no direct control over the nation's parks, game reserves, controlled-hunting areas and sanctuaries, as these are now being run by the Agricultural Offices of the respective regional governments.

The following categories of protected area are recognized in the country:

- National Park—areas set aside for the purpose of conserving and protecting wildlife and objects of aesthetic, ecological and scientific interest. Prohibited activities (unless written permission from the wildlife conservation authority is obtained) include hunting, cultivation, grazing cattle or livestock, felling trees, burning vegetation, residing in, or exploiting natural resources in any manner unless these activities are for the development and management of the park.
- Game Reserve—prohibited activities include possession of firearms and the hunting of animals, unless acting in accordance with the conditions of a game-capture permit, or with written permission. Persons are also prohibited from residing in game reserves without written permission from the wildlife conservation authority, excepting public officers on duty and persons resident prior to declaration. Persons authorized to reside in game reserves have the right to cultivate their land and to pasture and water domestic animals therein.
- Sanctuary—prohibited activities include grazing cattle, settlement and hunting of animals, unless acting in accordance with the conditions of a permit, or with written permission.
- Controlled Hunting Area—prohibited activities include grazing cattle, settlement, and the hunting of animals unless acting in accordance with the conditions of a permit.

National Parks and other strict nature reserves cover 161,600 km² or 13.5% of Ethiopia's land area, and include nearly all the major habitat-types to be found in the country. However, only Awash and Simen Mountains National Parks have been formally gazetted and legally recognized.

A large portion of the forests that remain outside the protected-area system are designated as priority forest areas. The main objectives of the priority forest area scheme are to promote soil conservation, watershed (and climatic) stabilization and the *in situ* preservation of indigenous plant species.

Table 2. The occurrence of restricted-range species at Important Bird Areas in Ethiopia. Sites that meet the A2 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **blue bold**.

113 – Jubba and Shabeelle valleys Endemic Bird Area (three species in Ethiopia; four sites meet the A2 criterion)							
IBA code:	057	060	066	068			
<i>Streptopelia reichenowi</i>	✓	✓	✓	✓			
<i>Mirafra degodiensis</i>							✓
<i>Ploceus dichrocephalus</i>	✓		✓	✓			
Number of species recorded:	2	1	2	3			
114 – South Ethiopian highlands Endemic Bird Area (five species in Ethiopia; seven sites meet the A2 criterion)							
IBA code:	056	057	058	061	062	064	065
<i>Tauraco ruspolii</i>		✓	✓	✓			✓
<i>Caprimulgus solala</i>	✓						
<i>Heteromirafra sidamoensis</i>					✓		
<i>Hirundo megaensis</i>							✓
<i>Zavattariornis stresemanni</i>						✓	
Number of species recorded:	1	1	1	1	1	2	1
115 – Central Ethiopian highlands Endemic Bird Area (four species in Ethiopia; seven sites meet the A2 criterion)							
IBA code:	003	015	016	018	019	028	044
<i>Francolinus harwoodi</i>		✓	✓				
<i>Myrmecocichla melaena</i>	✓	✓		✓			✓
<i>Serinus flavigula</i>					✓	✓	
<i>Serinus ankoberensis</i>				✓			
Number of species recorded:	1	2	1	2	1	1	1
s063 – Northern Ethiopia Secondary Area (one site meets the A2 criterion)							
IBA code:							028
<i>Cercomela dubia</i>							✓

Table 3. The occurrence of biome-restricted species at Important Bird Areas in Ethiopia. Sites that meet the A3 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **bold blue**. Any other species with a restricted range are highlighted in blue.

A04 – Sudan–Guinea Savanna biome (16 species in Ethiopia; five sites meet the A3 criterion)																											
IBA code:	001	004	006	007	015	019	028	032	037	039	042	055	056	059	061	064											
<i>Falco alopex</i>					✓		✓					✓															
<i>Merops bulocki</i>							✓				✓			✓													
<i>Cossypha albicapilla</i>																✓											
<i>Myrmecocichla albifrons</i>													✓														
<i>Turdoides tenebrosus</i>			✓									✓		✓													
<i>Turdoides leucocephalus</i>																											
<i>Cisticola ruficeps</i>												✓															
<i>Cisticola troglodytes</i>						✓						✓															
<i>Eremomela pusilla</i>		✓		✓					✓		✓				✓	✓											
<i>Muscicapa gambagae</i>											✓																
<i>Pytilia phoenicoptera</i>						✓					✓																
<i>Lagonosticta larvata</i>						✓					✓																
<i>Estrilda troglodytes</i>		✓									✓			✓													
<i>Vidua interjecta</i>											✓																
<i>Petronia dentata</i>			✓	✓	✓	✓		✓		✓	✓																
<i>Plocepasser superciliosus</i>		✓			✓	✓	✓				✓																
Number of species recorded:	3	1	1	2	6	2	3	1	1	1	11	2	1	4	1	1											
A07 – Afrotropical Highlands biome (49 species in Ethiopia; 26 sites meet the A3 criterion)																											
IBA code:	002	003	005	007	009	011	012	013	014	015	018	020	021	023	024	025	026	027	031	036	037	038	044	046	050	054	
<i>Bostrychia carunculata</i>	✓	✓	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Cyanochen cyanopterus</i>							✓	✓			✓	✓	✓		✓	✓		✓		✓				✓		✓	✓
<i>Buteo oreophilus</i>			✓				✓	✓									✓			✓							✓
<i>Francolinus psilolaemus</i>									✓		✓			✓													✓
<i>Francolinus harwoodi</i>										✓																	
<i>Francolinus erckelii</i>	✓	✓	✓		✓		✓	✓	✓	✓	✓			✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Francolinus castaneicollis</i>			✓																	✓						✓	✓
<i>Rougetius rougetii</i>	✓			✓			✓	✓				✓	✓		✓	✓		✓							✓		✓
<i>Vanellus melanocephalus</i>		✓					✓	✓				✓	✓		✓	✓											✓
<i>Columba albitorques</i>	✓	✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Streptopelia lugens</i>	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Agapornis taranta</i>		✓		✓	✓	✓	✓	✓		✓	✓						✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Tauraco leucotis</i>		✓		✓	✓	✓	✓					✓	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Asio abyssinicus</i>				✓																							✓
<i>Caprimulgus poliocephalus</i>					✓								✓	✓						✓							✓
<i>Schoutedenapus myoptilus</i>											✓															✓	✓
<i>Apus niansae</i>	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
<i>Lybius undatus</i>		✓		✓			✓					✓		✓			✓		✓	✓	✓	✓			✓	✓	✓
<i>Dendropicos abyssinicus</i>		✓			✓	✓	✓						✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Macronyx flavicollis</i>	✓						✓	✓	✓		✓		✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Monticola rufocinereus</i>	✓		✓		✓					✓		✓										✓	✓				✓
<i>Zoothera piaggiae</i>						✓	✓							✓			✓		✓	✓	✓	✓			✓	✓	✓
<i>Cossypha semirufa</i>		✓		✓	✓	✓	✓	✓	✓		✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Cercomela sordida</i>		✓	✓			✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓
<i>Myrmecocichla melaena</i>		✓		✓						✓	✓			✓											✓	✓	✓
<i>Thamnolaea semirufa</i>	✓	✓					✓		✓	✓	✓	✓			✓					✓	✓	✓	✓	✓	✓	✓	✓
<i>Pseudoalcippe abyssinica</i>		✓				✓	✓										✓		✓	✓	✓	✓			✓	✓	✓
<i>Parophasma galinieri</i>		✓	✓		✓	✓	✓		✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Phylloscopus umbrovirens</i>	✓	✓			✓	✓	✓		✓				✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Sylvia lugens</i>													✓	✓						✓							✓
<i>Dioptrornis chocolatinus</i>		✓			✓	✓	✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Parus leuconotus</i>		✓		✓	✓	✓				✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Nectarinia tacazze</i>		✓		✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Zosterops poliogaster</i>		✓	✓	✓	✓	✓				✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Serinus nigriceps</i>	✓	✓				✓		✓	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Serinus citrinelloides</i>		✓		✓			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Serinus xanthopygius</i>				✓					✓													✓					✓
<i>Serinus tristriatus</i>	✓	✓	✓		✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Serinus ankoberensis</i>										✓																	✓
<i>Serinus striolatus</i>	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Cryptospiza salvadorii</i>							✓						✓				✓		✓	✓							✓
<i>Passer swainsonii</i>	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Ploceus baglafecht</i>	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 3 ... continued. The occurrence of biome-restricted species at Important Bird Areas in Ethiopia. Sites that meet the A3 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **bold blue**. Any other species with a restricted range are highlighted in blue.

A07 – Afro-tropical Highlands biome ... continued (49 species in Ethiopia; 26 sites meet the A3 criterion)																											
IBA code:	002	003	005	007	009	011	012	013	014	015	018	020	021	023	024	025	026	027	031	036	037	038	044	046	050	054	
<i>Poeyptera stuhlmanni</i>																		✓			✓			✓	✓		
<i>Onychognathus tenuirostris</i>	✓	✓		✓		✓	✓	✓	✓		✓	✓		✓		✓		✓	✓	✓	✓	✓	✓			✓	
<i>Onychognathus albirostris</i>		✓				✓			✓	✓	✓			✓								✓					
<i>Cinnyricinclus sharpii</i>														✓			✓		✓	✓	✓	✓		✓		✓	
<i>Oriolus monacha</i>		✓		✓		✓	✓					✓		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	
<i>Corvus crassirostris</i>		✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	
Number of species recorded::	15	34	12	19	18	26	29	16	27	14	24	18	18	33	25	7	34	20	27	33	32	22	28	26	15	43	
A08 – Somali–Masai biome (98 species in Ethiopia; 18 sites meet the A3 criterion)																											
IBA code:	010	028	035	048	052	055	056	057	059	060	061	062	063	064	065	066	067	068									
<i>Melierax poliopterus</i>		✓	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓									
<i>Francolinus leucoscepus</i>		✓	✓	✓			✓	✓		✓	✓	✓			✓	✓	✓	✓									
<i>Acryllium vulturinum</i>		✓							✓	✓				✓		✓	✓										
<i>Neotis heuglini</i>			✓						✓			✓					✓										
<i>Eupodotis gindiana</i>		✓	✓	✓			✓		✓	✓	✓	✓	✓			✓	✓	✓									
<i>Eupodotis humilis</i>									✓	✓				✓													
<i>Pterocles decoratus</i>		✓	✓		✓					✓		✓															
<i>Streptopelia reichenowi</i>									✓		✓						✓	✓									
<i>Poicephalus rufiventris</i>		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									
<i>Tauraco ruspolii</i>									✓		✓				✓	✓											
<i>Corythaixoides leucogaster</i>		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									
<i>Caprimulgus fraenatus</i>				✓			✓	✓									✓	✓									
<i>Caprimulgus donaldsoni</i>									✓						✓	✓	✓	✓									
<i>Caprimulgus solala</i>									✓																		
<i>Caprimulgus stellatus</i>				✓		✓			✓					✓			✓	✓									
<i>Colius leucocephalus</i>																	✓	✓									
<i>Merops revoilii</i>			✓							✓							✓	✓									
<i>Phoeniculus somaliensis</i>		✓	✓	✓	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓	✓									
<i>Rhinopomastus minor</i>			✓	✓		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓									
<i>Tockus flavirostris</i>		✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓									
<i>Tockus deckeni</i>		✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓									
<i>Tockus hemprichii</i>			✓		✓		✓	✓						✓	✓												
<i>Tricholaema melanocephala</i>		✓	✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓									
<i>Trachyphonus erythrocephalus</i>		✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓			✓									
<i>Trachyphonus darnaudii</i>		✓	✓				✓		✓	✓			✓	✓	✓	✓	✓	✓									
<i>Mirafra pulpa</i>														✓													
<i>Mirafra hypermetra</i>		✓	✓				✓		✓																		
<i>Mirafra collaris</i>										✓				✓													
<i>Mirafra alopex</i>																											
<i>Mirafra gilletti</i>			✓	✓						✓		✓															
<i>Mirafra poecilosterna</i>									✓					✓				✓									
<i>Mirafra degodiensis</i>																		✓									
<i>Heteromirafra sidamoensis</i>														✓													
<i>Eremopterix signata</i>		✓	✓	✓	✓				✓		✓							✓									
<i>Calandrella somalica</i>											✓	✓		✓	✓			✓									
<i>Spizocorys personata</i>											✓			✓				✓									
<i>Pseudalaemon fremantlii</i>											✓			✓				✓									
<i>Hirundo megaensis</i>														✓													
<i>Tmetothylacus tenellus</i>											✓		✓				✓	✓									
<i>Lanius dorsalis</i>										✓		✓	✓	✓		✓		✓	✓								
<i>Lanius somalicus</i>		✓	✓												✓		✓										
<i>Dryoscopus pringlii</i>										✓					✓	✓	✓	✓									
<i>Tchagra jamesi</i>					✓					✓		✓		✓	✓	✓	✓	✓									
<i>Laniarius ruficeps</i>							✓	✓		✓	✓	✓		✓	✓	✓	✓	✓									
<i>Rhodophoneus cruentus</i>		✓	✓	✓		✓	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓									
<i>Turdus tephronotus</i>						✓	✓	✓			✓		✓	✓	✓	✓		✓									
<i>Oenanthe phillipsi</i>						✓				✓								✓									
<i>Cercomela scotocerca</i>						✓		✓										✓									
<i>Cercomela dubia</i>						✓												✓									
<i>Turdoides aylmeri</i>						✓	✓	✓				✓	✓	✓	✓	✓	✓	✓									
<i>Turdoides rubiginosus</i>						✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓									
<i>Turdoides leucopygius</i>						✓	✓	✓		✓		✓		✓				✓									
<i>Cisticola bodessa</i>						✓		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓									

Table 3 ... continued. The occurrence of biome-restricted species at Important Bird Areas in Ethiopia. Sites that meet the A3 criterion are highlighted in **bold**. Species of global conservation concern are highlighted in **bold blue**. Any other species with a restricted range are highlighted in blue.

A08 – Somali–Masai biome ... continued (98 species in Ethiopia; 18 sites meet the A3 criterion)																		
IBA code:	010	028	035	048	052	055	056	057	059	060	061	062	063	064	065	066	067	068
<i>Cisticola cinereolus</i>		✓				✓				✓				✓				
<i>Cisticola nanus</i>											✓	✓		✓	✓	✓		
<i>Prinia somalica</i>	✓								✓					✓	✓	✓	✓	
<i>Calamonastes simplex</i>		✓	✓		✓	✓	✓			✓	✓			✓	✓	✓	✓	
<i>Eremomela flavicrissalis</i>		✓		✓			✓							✓		✓		✓
<i>Sylvietta philippae</i>										✓					✓			✓
<i>Sylvietta isabellina</i>											✓		✓			✓		✓
<i>Sylvia boehmi</i>											✓			✓	✓	✓		
<i>Bradornis microrhynchus</i>	✓	✓			✓	✓				✓				✓		✓	✓	
<i>Batis perkeo</i>									✓	✓		✓		✓	✓	✓	✓	✓
<i>Anthoscopus musculus</i>		✓					✓	✓						✓	✓	✓	✓	✓
<i>Parus thruppi</i>					✓										✓	✓	✓	
<i>Anthreptes orientalis</i>		✓	✓			✓	✓	✓	✓	✓			✓	✓	✓	✓		
<i>Nectarinia hunteri</i>					✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Nectarinia habessinica</i>	✓	✓	✓		✓			✓		✓		✓	✓					✓
<i>Nectarinia nectarinioides</i>									✓	✓						✓		✓
<i>Zosterops abyssinicus</i>		✓				✓		✓			✓			✓	✓	✓	✓	✓
<i>Emberiza poliopleura</i>		✓	✓										✓	✓	✓	✓	✓	✓
<i>Serinus flavigula</i>		✓									✓							
<i>Serinus xantholaema</i>					✓						✓				✓			
<i>Serinus donaldsoni</i>										✓		✓		✓	✓			
<i>Serinus dorsostratus</i>		✓				✓								✓	✓	✓		
<i>Uraeginthus cyanocephalus</i>																		✓
<i>Uraeginthus ianthinogaster</i>		✓	✓					✓			✓		✓	✓	✓	✓	✓	
<i>Estrilda charmosyna</i>				✓									✓	✓				
<i>Lonchura griseicapilla</i>						✓								✓		✓		
<i>Vidua hypocherina</i>		✓		✓			✓		✓	✓		✓		✓		✓	✓	✓
<i>Vidua fischeri</i>		✓			✓			✓		✓				✓		✓	✓	✓
<i>Dinemellia dinemelli</i>	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Passer castanopterus</i>	✓										✓			✓				
<i>Passer gongonensis</i>						✓							✓					✓
<i>Plocepasser donaldsoni</i>						✓			✓									✓
<i>Pseudonigrita cabanisi</i>														✓	✓	✓		
<i>Ploceus bojeri</i>										✓								
<i>Ploceus galbula</i>	✓	✓		✓										✓				
<i>Ploceus spekei</i>		✓		✓										✓				
<i>Ploceus dichrocephalus</i>			✓					✓									✓	✓
<i>Onychognathus blythii</i>		✓																
<i>Onychognathus salvadorii</i>	✓	✓		✓						✓			✓		✓			✓
<i>Lamprolornis shelleyi</i>	✓				✓		✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
<i>Speculipastor bicolor</i>							✓		✓	✓			✓	✓		✓	✓	✓
<i>Spreo fischeri</i>					✓													✓
<i>Spreo albicapillus</i>		✓				✓				✓	✓	✓		✓	✓			✓
<i>Cosmopsarus regius</i>		✓					✓	✓		✓	✓		✓	✓	✓	✓	✓	✓
<i>Zavattariornis stresemanni</i>														✓				
Number of species recorded:	23	51	27	20	17	31	25	22	28	47	30	18	26	63	43	49	35	36

INTERNATIONAL MEASURES RELEVANT TO THE CONSERVATION OF SITES

Ethiopia is party to the Convention on Biological Diversity, the Convention on International Trade in Endangered Species, the Convention to Combat Desertification, the Convention on Climate Change, the International Plant Protection Convention and the World Heritage Convention, under which seven sites have been designated. Regionally, the country is signatory to the African Convention on the Conservation of Nature and Natural Resources.

OVERVIEW OF THE INVENTORY

This inventory identifies 69 Important Bird Areas (IBAs), covering at least 47,757 km², equivalent to at least 4.3% of the land area of the country but, importantly, the areas of 29 sites remain undefined

(Map 1, Table 1). Fifty-three of the sites qualify under the A1 criterion. Four sites do so for the Jubba and Shabeelle valleys EBA (113) at which all three species known from Ethiopia occur, seven sites have been selected for South Ethiopian Highlands EBA (114) at which all five species occur and a further seven qualify for Central Ethiopian highlands EBA (115) which hold, collectively, all four species. Under Category A3, five sites have been selected for the Sudan–Guinea Savanna biome (A04), holding 15 of its 16 species recorded nationally, 26 sites for the Afrotropical Highlands biome (A07) (all 49 species) and 18 sites for the Somali–Masai biome (A08), at which all but one of the 98 species have been recorded. No sites have been selected for the Sahel biome species. Twenty-one sites qualify on the basis of the numbers of congregatory waterbirds they hold. Nine sites are National Parks, two are wildlife sanctuaries and nine are priority forest areas. The remainder are entirely unprotected.

Ornithological data come from published sources and unpublished observations of the IBA team of the Ethiopian Wildlife

and Natural History Society, and from other contacts. Data on many species, including those of global conservation concern, are extremely inadequate, while many sites detailed here are in urgent need of monitoring and, where necessary, of action on the ground if they are to retain their conservation importance. It is also important to conduct surveys in areas such as the Ogaden and Assosa that have never been explored properly.

COMMENTS ON THE INVENTORY

The list of IBAs in this inventory differs somewhat from that published previously (Ethiopian Wildlife and Natural History Society 1996) as it includes several sites (ET011, ET021, ET025, ET026, ET036, ET051, ET053) that have been identified and surveyed since the appearance of the first inventory, while one site, the Awash river valley (012 in the previous volume), has been dropped, since, upon re-evaluation, it was decided that it was neither definable nor defensible as a site. The opportunity has been taken to update information for a number of sites which also appear here renumbered, according to the international convention adopted.

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GLOSSARY

Wereda an administrative district.

SITE ACCOUNTS

Shire lowlands in the Tekeze valley

Admin region Tigray

Coordinates 14°00'N 37°00'E

Area Undefined Altitude 600–1,900 m

ET001

A3 (A04)

Unprotected

Site description

The moist, fertile Shire lowlands are in the Western Zone. They are in the lower reaches of the wide Tekeze valley (at 600 m) between Enda Selassie at 1,900 m on the northern rim of the Tekeze gorge, Sheraro to the north-west and Birkuta to the west, near the border with Eritrea. Enda Selassie is c.200 km north of Gondar and 50 km west of Axum. The Shire lowlands are relatively under-populated compared to the rest of Tigray Region. They represent the easternmost extension of the Sudano–Sahelian zone. The higher, eastern section of Shire is on the western extension of the plateau where the terrain is flat to undulating. Towards the Tekeze and its larger tributaries, fairly deep valleys break the land, and several have cut through thick layers of red fossil soils which are almost sterile and support little or no vegetation. The lower western Shire lowlands, towards the border with Eritrea, comprise flatter plains, but with some higher hills such as Tsada Emba (White mountain).

The area supports a range of vegetation-types. On the higher eastern plateau, now mostly cultivated, wooded grassland thrives. Marshes with patches of tall sedges and bulrushes are formed in the shallow valleys where drainage is impeded. Forest patches are found above 1,000 m and comprise broad- to fine-leaved deciduous species. Most of the areas on broken terrain below 1,500 m are covered in *Acacia–Combretum* woodland with large trees of baobab *Adansonia digitata* and *Tamarindus indica*. Important species include the threatened African blackwood *Dalbergia melanoxylon*, the economically exploited frankincense tree *Boswellia papyrifera*, and the source of gum arabic, *Acacia senegal*. Much of the remaining area would naturally be covered in edaphic tall grassland, with some patches of woody species such as *Balanites aegyptiaca*. The Kunama people have long inhabited this area: they used to be hunter-gatherers until other groups recently moved into the area, and they then adopted a more sedentary, cultivation-oriented existence. The other traditional groups of the whole western lowlands

are pastoralists; these include the Beni Amer based to the north in Eritrea, and the Benshangul and Gumuz peoples to the south. These groups bring large numbers of sheep, goats, cattle and camels into the Tekeze lowlands to make use of seasonal grazing/browsing. The flatter areas on both the plateau and the lowlands towards the Eritrea and Sudan borders are extensively cultivated, primarily for cotton, sorghum and sesame, and mostly by people from the highlands.

Birds

See Box and Table 3 for key species. The avifauna at this site is poorly known. A survey in 1992 recorded 152 species, including several species of the Somali–Masai biome, such as *Uraeginthus cyanocephalus* and *Vidua fischeri*. Other interesting birds include *Falco ardosiacus*, *Ptilopachus petrosus*, *Pluvianus aegyptius*, *Merops orientalis*, *Phoeniculus purpureus* and *Laniarius erythrogaster*.

Key species

A3 (A04) Sudan–Guinea Savanna biome: Three of the 16 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

A record of the snake *Naja haje* represents the first for Ethiopia. The forests and woodlands in the area support the endemic tree *Albizia malacophylla malacophylla* and the threatened African blackwood *Dalbergia melanoxylon*.

Conservation issues

The Shire lowlands have long been used as an area in which to hunt large mammals. There are records from the Ptolemaic period over 2,000 years ago of hunting parties targeting elephant. This tradition was continued until the early part of the twentieth century, with hunting parties of highlanders visiting the area. Until at least the 1940s, in spite of the hunting, much wildlife persisted in the area. However, populations of the large mammals and the smaller antelopes and gazelle have now been decimated by habitat destruction and uncontrolled hunting. The instability that existed in northern Ethiopia until the early 1990s, coupled with the ready access to firearms, has made it all too easy for people to kill wild animals. The instability

also hampered plans to develop a Wildlife Reserve in the Shire lowlands. However, with the current peaceful situation, the Regional Government in Tigray is again very interested in establishing a refuge for the wildlife.

Further reading

Cossins (undated), Imperial Ethiopian Government (1973), Olson (1976), Pankhurst (1996).

Dessa'a forest

Admin region Tigray

Coordinates 13°45'N 39°43'E

Area 120,026 ha

Altitude 1,500–2,500 m

ET002

A1, A3 (A07)

National Forest Priority Area

Site description

Dessa'a forest is on the eastern escarpment, north-east of Mekele and c.20 km south-east of Agula town, Eastern Zone. The topography in Dessa'a is varied and includes some flatter areas and gentle slopes as well as steep scarps. The forest extends in an easterly direction along and down the escarpment, and forms a climatic buffer zone between the cool highlands of Tigray and the hot lowlands in Afar Region. Generally, rainfall along this part of the escarpment is marginal for tree growth. However, it seems likely that the forest abstracts moisture from the clouds that build up along the escarpment. Close to the forest there is a valley where one of the oldest irrigation systems in the country still functions. The soils in the valley are deep and fertile with both grassy and somewhat swampy patches as well as cultivated fields. Most of the trees in the forest are found at the higher altitudes, and relatively undisturbed forest exists only on the steep eastern slopes. A detailed study of the vegetation has not been made, but the species composition is most likely similar to that of the escarpment forests in Eritrea. The dominant tree species is *Juniperus procera*, with some patches of *Olea europaea cuspidata*; at lower altitudes *Juniperus procera* tends to be replaced by *Acacia* spp. including *A. origena*, a species only found on the eastern escarpment of Ethiopia and Eritrea, and in Yemen. A range of small understorey trees and bushes are likely to occur. Particularly characteristic of such dry montane forests are *Barbeya oleoides* (a monotypic family), *Cadia purpurea*, *Berberis holstii* and *Tarchonanthus camphoratus*. The plateau above the escarpment is heavily cultivated and the forest provides valuable grazing, particularly in the dry season. A major feature of the forest is the centuries-old track that passes through it, used by camel trains bringing blocks of salt up from the Afar.

Birds

See Box and Table 3 for key species. This is the only known location in Ethiopia for *Emberiza cineracea*, whose range within Africa otherwise extends only to Eritrea. However, the species is known only from one record of a single bird. *Circus macrourus* has also been recorded. A total of 42 bird species have been recorded from the forest and 67 from the plateau directly west of the forest. The combined total includes 15 species belonging to the Afrotropical Highlands biome of which one, *Serinus nigriceps*, is an Ethiopian endemic near the edge of its range. Below 1,800 m, two Somali–Masai biome species occur, namely *Tockus flavirostris* and *Uraeginthus ianthinogaster*. The eastern escarpment in this area is a distinct flyway for migrating eagles, with up to 50 *Aquila nipalensis* recorded on one day in October 1995.

Key species

A1	<i>Circus macrourus</i>	<i>Rougetius rougetii</i>
A3 (A07)	Afrotropical Highlands biome: 15 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

It appears that there is currently no natural forest regeneration. Grazing by domestic animals is given as a main cause for this, but the area is now very dry and climatic changes should not be ruled out. Many of the trees are old, and many of those at the top of the forest next to the plateau support a heavy growth of a dwarf mistletoe,

Arceuthobium juniperi-procerae. A big fire in 1969 destroyed a large part of the forest. The areas most seriously affected were colonized by evergreen bushland species, particularly *Dodonea angustifolia* and *Euclea* spp. However, recent reports suggest that there is some forest regeneration in these areas. A survey in 1992 found that c.30% of the area was still forested. The plateau is heavily farmed and the traditional irrigation system has been somewhat damaged. It should be studied and repaired before irreparable damage occurs. It would be beneficial to integrate both the plateau and the Dessa'a forest in any conservation-oriented activities.

Further reading

Dijkzen (1996), Friis (1992), Tadesse (1992), Teklu (1992).

Simen Mountains National Park

Admin region Amhara

Coordinates 13°10'N 38°10'E

Area 19,000 ha Altitude 1,900–4,430 m

ET003

A1, A2 (115), A3 (A07)

National Park

Site description

Simen Mountains National Park is on the northern edge of the Ethiopian central plateau, overlooking the Tekeze gorge. It is 132 km from Gondar, the capital for North Gondar Zone. The park is scenically dramatic, and comprises a narrow strip of land along the top of the cliffs (at 3,300–3,800 m), the cliffs themselves, with sheer drops of c.1,000 m, and another strip of land at the bottom (down to c.1,900 m). The highest peak in the park is 4,430 m. The main habitats are: Afro-alpine grassland on the highest areas; ericaceous forest below 3,500 m and, on the steep slopes at the top of the gorge, a mixture of tussock-grasses; cliff-hanging herbs and small shrubs on the cliffs; and montane coniferous forest and grassland at the lowest altitudes. There are also fast-flowing, permanent streams, very high waterfalls and rocky areas. The Afro-alpine flora is important because it contains a high proportion of regional and local endemics. For example, 10 species of grass (19%) recorded from the Simen area are endemics. The grassland is dominated by tussock-grasses including *Festuca gilbertiana*, which is only known from the Geech plateau in Simen. The most conspicuous plants at these high altitudes (all Afro-alpine endemics) are giant *Lobelia* species and *Kniphofia foliosa*. A stonecrop, *Rosularia semiensis*, is also endemic to the Simen mountains. The dominant tree of the ericaceous belt is *Erica arborea* with patches of *Hypericum revolutum* and *H. quartinianum*. Few areas of pristine *Erica* forest (i.e. where trees meet overhead and the ground is covered with grasses and other herbs) remain. Those that do are where the slopes are too steep for men to climb down and cut trees. Crops are cultivated and domestic animals graze throughout the area, even on the steep slopes. On the plateau, barley is the only crop grown, while at lower altitudes the cereals are more typical of the highlands. The villagers of Geech weave traditional cotton cloth, and the park employs a number of local people.

Birds

See Box and Tables 2 and 3 for key species. Over 137 species are known to occur within the park, including a high proportion of the Afrotropical Highlands biome assemblage such as *Francolinus castaneicollis*, *Agapornis taranta*, *Tauraco leucotis*, *Thamnolaea semirufa*, *Pseudoalcippe abyssinica*, *Onychognathus albirostris* and *Oriolus monacha*. Below the escarpment four Somali–Masai biome species and one Sudan–Guinea Savanna species have been recorded. The park is thought to support important populations of *Vanellus melanocephalus* on the Geech plateau and, on the cliffs, *Columba albitorques*, *Thamnolaea semirufa* and the restricted-range *Myrmecocichla melaena*. During the 1960s it was suggested that *Vanellus melanocephalus* bred on the Geech plateau, but there are no recent reports to confirm this. A small population of *Macronyx flavicollis* is known to be present. A small population of *Pyrhacorax pyrrhacorax* lives on the Geech plateau, apparently entirely separate from the population in the Bale mountains, the only other population of this bird in the region. This area is particularly rich in raptors and vultures. Small numbers of *Circus macrourus* are recorded seasonally and *Gypaetus barbatus* and *Buteo augur* are generally common throughout the park. Other spectacular species include *Aquila wahlbergi*, *A. verreauxii*, *Polemaetus bellicosus*, *Spizaetus africanus*, *Accipiter rufiventris*, *Falco alopex*, *Bubo capensis* and *Asio abyssinicus*.

Key species

A1	<i>Circus macrourus</i>	<i>Macronyx flavicollis</i>
A2 (115)	Central Ethiopian highlands EBA: One of the four species of this EBA has been recorded at this site; see Table 2.	
A3 (A07)	Afrotropical Highlands biome: 34 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

The most abundant large mammal is the endemic *Theropithecus gelada* (LR/nt). Other large herbivores include *Capra walia* (CR) and the endemic *Tragelaphus scriptus meneliki*. There are also numerous rodents, including two endemic species of rat, that live in the Afro-alpine grasslands. *Canis simensis* (CR) also occurs. A number of endemic plants are mentioned above under ‘Site description’.

Conservation issues

The Simen Mountains National Park was gazetted in 1969—one of only two National Parks to be gazetted in Ethiopia. It was set up primarily to protect *Capra walia* and the impressive, rugged scenery. In 1978, the park was recognized as a UNESCO World Heritage Site. During the first 15 years of its establishment, a park-management structure was created, staff living-quarters built, staff employed, and some of the more destructive activities of the local people controlled. By the early 1980s, as a consequence of these efforts, the population of *Capra walia* had risen to around 500 and it was easy for any visitor to see these animals. However, between 1984 and 1991, the civil war in the north-east of the country spread to the Simen area. Staff were driven out, living quarters were destroyed and the large mammals (including *Capra walia*) were shot at and scared away or killed. In 1994, a count of *Capra walia* found only 62 animals inside the park (with greater numbers found outside). It is estimated that only 12–24 *Canis simensis* remain in the Simen area. A survey in 1995 estimated that 11,000 people now live in and around the park, at least 72% of these inside it. A large part of the park has now been devastated by cultivation and grazing activities. Other problems include fires and the construction of an all-weather road through the park to Mekane Birhan. All the resources in the park are threatened, and urgent conservation action is needed. In 1995, the Regional Government, with concerned local and international NGOs, started the process of developing a management strategy for the park and its surrounding area based on community participation. There is now much interest from the Amhara Regional Government, Central Government and international authorities to assist in the rehabilitation and conservation of this important area.

Further reading

Drake (undated), Dunbar and Dunbar (1974), Edwards (1996), Hillman (1993), Hurni (1986), Klotzli (1975), Lilyestrom (1974), Ministry of Natural Resources Development (MoNRDEP) *et al.* (1995), Nievergelt (1981).

Lake Ashenge

Admin region Tigray

Coordinates 12°35'N 39°30'E

Area Undefined Altitude 2,400–3,000 m

ET004

A1, A4i

Unprotected

Site description

Lake Ashenge is in Ofla Woreda of the Southern Zone. The nearest town is Korem, about 120 km south of the regional capital Mekele. The lake and its surrounding area occupy an old volcanic crater between the Ambalagie range to the north and the Alamata mountains to the south. The altitude at the lake is 2,400 m while the mountains to the north rise to over 3,000 m. The lake is fed by a number of small streams from the surrounding areas, and as far as is known there is no drainage out of it. The crater rim forms steep cliffs all around, except in the north-east where there is a long valley. Korem is situated in a long valley to the south. The area surrounding the lake is relatively flat, producing extensive areas of shoreline, and large areas of marshland extend into the valley to the north-east. The lake has a surface area around 14,000 ha, a mean depth of c.14 m and a maximum depth of 25.5 m. The water is slightly saline. Villages are situated on the flatter land at the foot of the cliffs, but all of the surrounding land is used for agriculture. The valley in the north-east is an important grazing area, particularly through the dry season. Land is divided

between villages and access to the grazing area is carefully managed. The flora of this area has never been documented. Some trees are found in the area, often confined to domestic gardens, including *Acacia* shrubs, *Croton macrostachyus*, *Vernonia amygdalina* and *Buddleja polystachya*. Additionally, some forest trees are found around churches and in Muslim graveyards: species include *Acacia abyssinica*, *A. pilispina*, *Ekebergia capensis*, *Juniperus procera* and *Olea europaea cuspidata*. Mixed agriculture dominates the area, with cereals and pulses the main crops, and cattle and sheep the main domestic animals. Fish were introduced into the lake, but for unknown reasons the harvest has not been sustainable.

Birds

See Box for key species. The lake probably holds 20,000 waterbirds on a regular basis: a total of 17,000+ was recorded in January 1995. At least 30 *Aythya nyroca* have been recorded. A small number of Afrotropical Highlands biome species occur including the endemic *Serinus nigriceps*, *Columba albitorques*, *Onychognathus albirostris* and *Corvus crassirostris*. Other interesting species include *Bubo capensis* and *Turdoides tenebrosus*, the latter a species of the Sudan–Guinea Savanna biome; see Table 3.

Key species

A1	<i>Aythya nyroca</i>	<i>Rougetius rougetii</i>
A4i	<i>Bostrychia carunculata</i>	Breeding (pairs) Non-breeding
		— 133+

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Lake Ashenge is a closed ecosystem. Recent efforts to increase crop production through the use of high-yielding varieties, which require high doses of fertilizers and pesticides, have targeted Ofla Woreda, as its main crops, maize and wheat, respond well to such a system. The resulting accumulation of chemical residues in the lake could have a serious negative impact on the productivity of this wetland. Thus, appropriate monitoring schemes should be initiated to track the situation closely. A project has recently been started in Tigray Region aimed at encouraging organic farming methods as a means of increasing food production (and reducing the introduction of chemicals to the environment). A village next to Lake Ashenge has joined this project.

Further reading

Dodman and Taylor (1995).

Hugumburda and Grat-Kahsu forests
ET005

Admin region Tigray

Coordinates 12°32'N 39°34'E

Area 40,000 ha

Altitude 1,600–2,600 m

A3 (A07)

National Forest Priority Area

Site description

Hugumburda and Grat-Kahsu are two contiguous forests situated between the towns of Mai Chew and Alamata, Southern Zone. The whole Alamata mountain area comprises volcanic rock. There is a distinctive flora associated with this rock that includes the rare endemic *Delosperma abyssinica* (a succulent mesembryanthemum) and the shrub *Cadia purpurea*. The forest block starts at the foot of the escarpment to the west of the Raya plain and continues up over very broken terrain onto the Alamata mountains, up to c.2,600 m. The forest is dry evergreen/coniferous with *Juniperus procera*, *Olea europaea cuspidata* and some *Podocarpus falcatus* in the higher sections. Lower down, *Milletia ferruginea*, *Croton macrostachyus*, *Celtis africana*, *Ekebergia capensis*, *Prunus africana*, *Cordia africana* and *Ficus* spp. are more common. Hugumburda and Grat-Kahsu forests represent the only significant expanse of dry coniferous forest in the region. No detailed study of the species composition has been carried out. The area includes c.1,200 ha of exotic tree plantation.

Birds

See Box and Table 3 for key species. The avifauna at this site is poorly known. A preliminary survey found 58 species, of which 12 were

Afrotropical Highlands biome species, including the endemic *Parophasma galinieri*. Further surveys would undoubtedly find more species of this biome, and possibly some from the Somali–Masai biome. Over 100 *Bostrychia carunculata* have been reported from the nearby Lake Ashenge (site ET004) and local reports suggest that many of these roost in at least two places within the forest. The survey in October 1995 also recorded 13 Palearctic migrant species, including *Sylvia nisoria*.

Key species

A3 (A07) Afrotropical Highlands biome: 12 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Local people make extensive use of any easily accessible areas of forest to provide fuelwood and construction materials. However, parts of these forests are on very broken terrain with sheer cliffs separating isolated blocks that retain good vegetation cover. Such areas could provide important refuges for the indigenous wildlife. Until the early 1990s, this part of Tigray was better known for its huge camps of famine victims than its natural resources, so it is not surprising that the forests have not been properly managed, and there continues to be insufficient manpower and funds to develop an appropriate management plan. Afforestation activities on the more accessible slopes began in the early 1970s, and the regional government is now helping to expand these further. Three tree nurseries—in Korem, Ashenge and Addis-Fana—are producing exotic species for the afforestation programme.

Further reading

Dijksen (1995), Teklu (1992).

Fogera plains

Admin region Amhara

Coordinates 11°57'N 37°42'E

Area Undefined Altitude 1,750 m

ET006

A1

Unprotected

Site description

The Fogera plains lie to the east of Lake Tana, near the town of Woreta on the road from Bahir Dar to Gondar, c.582 km from Addis Ababa. This area mainly consists of a flat, open plain across which the Rib river flows into Lake Tana. The Gumera river forms the southern boundary. Both rivers originate on the high plateau to the east, and as they reach the plains the gradient decreases and they form meanders. During and after the rainy season, as the Rib river approaches the level of Lake Tana, water overflows its banks and floods the surrounding area. The perennial Gumera river also overflows its banks as it approaches the lake, but causes less flooding than the Rib. A perennial swamp has been formed around the mouths of these rivers. Lake Tana, which forms the western boundary of this area, also floods up to 1.5 km inland during the rainy season. During the dry season, the water retreats and the flooded area is used for seasonal grazing and retreat cultivation. The extent of the marsh depends on the amount of rain, as no other surface water feeds it. The shoreline of the lake supports well-established papyrus beds 4 m tall. Further inland the vegetation is dominated by sedges, reed grasses and bulrushes, along with swamp grasses such as *Echinochloa* spp. and *Cynodon aethiopicus* that make very good grazing in the dry season. Patches of mixed small- and broadleaved trees and bushes are found around churches on small, rocky hills near the lake shore. These patches contain trees such as *Albizia* spp., *Croton macrostachyus*, *Cordia africana*, *Olea europaea cuspidata*, figs and *Phoenix reclinata*. The more shrubby areas comprise species typical of degraded forest, with *Carissa edulis*, small *Acacia* spp., *Rosa abyssinica* and *Dodonea angustifolia*. A variety of plants are found in and around homesteads, including *Arundo donax*, *Guizotia scabra*, *Solanum* spp. and other broadleaved plants. Papyrus is essential for making the local reed boats called 'tankwas'. Other reeds and bulrushes are used for matting, fencing and roofing, but as soon as farmers can afford it they use corrugated iron or aluminium sheets for roofing. The plains support a large population of an indigenous

breed of cattle, Fogera, named after the area. Cattle-farming is still a major activity, but crop cultivation has become increasingly important. In the 1970s, an agricultural research station was established at Woreta to promote rice as a crop. Although the rice grew well, there was little market for it, as local mills were not equipped to husk it. However, farmers have expanded cultivation of other crops, particularly shallots and other vegetables, which are otherwise traditionally grown with supplementary irrigation.

Birds

See Box for key species. This site is important for a number of globally threatened species: *Falco naumanni* and *Circus macrourus*, which occur on spring and autumn migration; *Grus carunculatus*, which is uncommon; and *Phoenicopterus minor*, whose numbers fluctuate unpredictably. A survey in March 1996 found *Gallinago media* in the swampy grasslands, and it may also be expected on autumn migration when the habitat would be more suitable. The marshes are important for waterbirds including *Grus pavonina* and *G. grus*, and may also be suitable for *Sarothrura rufa* and *Sarothrura ayresi*. Fig trees at the site are popular with *Poicephalus flavifrons*. In addition, one species of the Sudan–Guinea Savanna biome occurs; see Table 3.

Key species

A1 *Falco naumanni*
Grus carunculatus

Phoenicopterus minor
Circus macrourus

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The marshes have decreased in extent due to drainage and the recent expansion of seasonal cultivation. The forest patches are severely impacted by heavy human use. Local farmers consider the waterbirds to be pests, and will use any means to try and eradicate them. This negative attitude towards birds in general, and in particular cranes and geese, stems from their links with crop damage: *Grus grus* can strip fields of ripe sorghum bare, and geese will systematically crop fields of sprouting cereals. Farmers also believe that bird droppings foul their water supply.

Further reading

Anon. (undated), Masselli-Novelli (1986).

Bahir Dar–Lake Tana

Admin region Amhara

Coordinates 11°37'N 37°25'E

Area c.500,000 ha Altitude 1,800 m

ET007

A1, A3 (A07), A4iii

Unprotected

Site description

Lake Tana is in the north-west corner of the Ethiopian plateau, c.350 km north-west of Addis Ababa. The Lake is the largest in Ethiopia, being c.68 km wide and 73 km long, but only a maximum of 14 m deep. There are 37 islands in the Lake, many of them sites for ancient churches and monasteries, others supporting large colonies of birds. Bahir Dar, the capital of Amhara Region, is on the southern shore of the lake where the Abbay (Blue Nile) river flows out. The Lake Tana basin has a catchment of 150,000 km². It is fed by over 60 rivers (the major ones are the Gilgel Abbay, Megech, Gumara and Rib) and streams flowing from the Simen mountains to the north, the large central plateau to the east and the gentler sloping land to the west. The variation in annual water-level is c.1.6 m. The major habitats around Lake Tana are farmland, grassland, forest, rocky areas, marsh, reedbeds and the lake itself. Water retention is high, making the area prone to inundation. The Bahir Dar area is particularly well known for oil crops and *Carthamus tinctorius*. The flat land, particularly where water lies in the rainy season, is grassland with a mixture of palatable indigenous grasses and legumes. The marshes support a variety of grasses, sedges and climbers. The mixed forests comprise figs, *Syzygium guineense*, *Cordia africana*, *Albizia* spp., *Prunus africana* and the endemic *Milletia ferruginea* as common trees, a well-developed shrub layer and woody climbers. Huge figs, *Ficus vasta*, are also found as isolated trees in farmland and on the lake shore. The Zege peninsula is home to a distinctive coffee variety that grows in the shade of *Acacia*

and *Milletia ferruginea* trees. One of the most striking features of Lake Tana is the extensive *Papyrus* beds from which the local boats, ‘tankwa’, are made. Other large plants in the reedbeds are *Typha*, *Echinochloa* spp. grasses and *Polygonum*. Several aquatic plants, including *Nymphaea coerulea*, are noticeable. Fortunately, the invasive *Eichhornia crassipes* is not present. The human population of Bahir Dar is growing quickly as the city develops, now having two institutes of tertiary education and a large school-age population. Farming and fishing are the most common occupations outside the town and there are many priests, monks and nuns associated with the churches around the lake and on several of the larger islands.

■ Birds

See Box and Table 3 for key species. This site is particularly important for waterbirds, some of which occur in large numbers. In combination, numbers are thought to exceed 20,000 seasonally. A detailed count was made in December 1993. Species that occurred in particularly high numbers included *Phalacrocorax carbo*, *Anhinga rufa* (98+), *Mesophox intermedia*, *Threskiornis aethiopicus*, *Dendrocygna bicolor* and *D. viduata*. Other waterbirds of interest noted in substantial numbers include *Anastomus lamelligerus* and *Grus grus*. *Grus pavonina*, *Larus ichthyaetus*, *Larus cachinnans* and *Egretta gularis* occur in smaller numbers, and both *Botaurus stellaris* and *Podica senegalensis* have been recorded. In addition Bahir Dar has the most northerly records in Ethiopia of *Sarothrura rufa*. A number of globally threatened species occur: *Grus carunculatus*, seen irregularly in small numbers; *Phoenicopterus minor*, whose numbers fluctuate unpredictably; *Rougetius rougetii*, resident in small numbers; *Circus macrourus*, fairly common during migration time, with a few overwintering; and *Aquila clanga*, recorded at the site but rare. A survey in March 1996 recorded 217 species, and more are known to occur. *Asio abyssinicus*, *Parus leuconotus*, *Serinus xanthopygius* and *Lybius undatus* are notable among the Afrotropical Highlands biome species. In addition, two Sudan–Guinea Savanna biome species have been recorded; see Table 3. Other species of interest include *Nectarinia kilimensis*, which has been reported on a number of occasions, and *Lagonosticta rufopicta*, which is fairly common. *Ceratogymna brevis* nests in the large figs around the lake, including in the grounds of the larger hotels in Bahir Dar, and both *Picoides obsoletus* and *Cisticola eximia* are known from the area to the west of Lake Tana.

Key species

A1	<i>Grus carunculatus</i>	<i>Phoenicopterus minor</i>
	<i>Circus macrourus</i>	<i>Rougetius rougetii</i>
A3 (A07)	Afrotropical Highlands biome: 19 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds on a seasonal basis.	

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

As Bahir Dar is the administrative centre for the region and has a large student population, there is a great need and opportunity for both formal and informal environmental education; the Bahir Dar Teacher’s College developed an Environmental and Family Life Education Centre in recognition of this need. As a consequence of the growing human population, the important area of forest on the Zege peninsula is fast being destroyed. Bahir Dar gets some of its fuelwood from this forest, but more is now being brought from areas further away to the west of Lake Tana. This ‘imported’ wood is brought to Zege and sent to Bahir Dar on ‘tankwas’. So far, there is little use of agrochemicals, so the lake remains free of such contamination. However, there is a growing industrial sector in Bahir Dar that uses water from the Abbay river and returns the spent water to the same source. It is hoped that the government will be able to get factory owners to control the quality of the effluent from their plants before industrial pollution becomes a serious issue. Farmers persecute the birds that damage their crops, in particular the cranes and geese.

■ Further reading

Hughes and Hughes (1992), Japan International Cooperation Agency (JICA) (1977).

Lake Abe wetland system

Admin region Afar

Coordinates 11°16'N 41°45'E

Area Undefined Altitude 240 m

ET008

A1, A4iii
Unprotected

■ Site description

The Awash river ends in a chain of saline lakes of which the largest are Gamari, Afambo, Bario and Abe. These all lie to the east of Asaita, the regional capital. Lake Afambo is about 30 km east of Asaita, and Lake Abe is on the eastern border with Djibouti, 600 km north-east of Addis Ababa. On the ground it is difficult to distinguish Lake Abe from Lake Afambo. Lake Abe comprises 34,000 ha of open water and 11,000 ha of the surrounding saltflats that can extend for 10 km from the edge of the water. Records give a maximum depth of 37 m (mean 8.6 m). However, the water-level is gradually dropping due to droughts and abstraction of water upstream. The Awash enters Lakes Abe and Afambo on their north-western shores and is the only source of fresh water for these lakes. Very little is known of the vegetation except that the surrounding shrubs and bushes are all highly salt-tolerant.

■ Birds

See Box for key species. Only a small percentage of the site has been properly surveyed, but good numbers of many congregatory wetland species are known to use the area, including *Dendrocygna viduata*, *Pelecanus onocrotalus*, *Ardeola ralloides*, *Bubulcus ibis*, *Egretta garzetta* and *Leptoptilos crumeniferus*. The site is also an important staging point on the migration route to and from the Arabian peninsula, and thus is used by many Palearctic species both in spring and autumn. Such species include *Acrocephalus griseldis*, although its current status at the site is unknown. This area is known to support populations of a number of the Somali–Masai biome species

Key species

A1	<i>Acrocephalus griseldis</i>
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds.

■ Other threatened/endemic wildlife

Gazella spekei (VU), *Gazella dorcas* (VU) and *Dorcatragus megalotis* (VU) all occur in the Lakes Abe and Afambo area.

■ Conservation issues

The main problem affecting this area is the development of irrigated farms further up the Awash valley leading to a reduced inflow of water and consequent reduction in the size of the lakes. The area is also being opened up with new roads that may attract more people with an inevitable impact on the ecology of the area.

Yegof forest

Admin region Amhara

Coordinates 11°06'N 39°45'E

Area 18,000 ha

Altitude 2,000–3,000 m

ET009

A3 (A07)

National Forest Priority Area

■ Site description

Yegof forest is in South Welo Zone, on a steep mountain ridge overlooking Kombolcha town, 395 km north of Addis Ababa. It is composed of natural highland forest and plantations of fast-growing exotic trees. The natural forest, which once covered Mt Yegof, comprised dry evergreen, and mixed conifer and broadleaved trees. It is dominated by *Juniperus procera*. Other characteristic tree species are *Olea europaea cuspidata*, *Erica arborea* and *Hypericum revolutum*, with *H. quartinianum* at the higher altitudes. Lower down are various *Acacia* spp., *Bersama abyssinica*, *Croton macrostachyus*, *Syzygium guineense*, *Rhus vulgaris*, tree *Euphorbia* spp., *Albizia* spp. and (even lower) *Cordia africana*.

■ Birds

See Box and Table 3 for key species. A survey in April 1996 recorded 62 species at the site. *Parophasma galinieri* was particularly numerous. *Dendropicos abyssinicus* was found nesting and *Laniarius aethiopicus* was seen collecting nesting material. Other species of interest include

Columba arquatrix and *Centropus monachus*. The *Phoeniculus purpureus* seen here have entirely red bills.

Key species

A3 (A07) Afrotropical Highlands biome: 18 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

The endemic subspecies *Tragelaphus scriptus meneliki* occurs.

Conservation issues

Natural forest returned after the 1973–1974 famine when the mountain was protected. This could form an exciting precedent for the protection and subsequent regeneration of other highland areas that have lost all their natural vegetation. Human encroachment into Yegof forest has started again, with farmers residing inside the forest boundaries. This is the major threat to the natural forest. In spite of the presence of guards, extraction of wood for construction and fuel still occurs. The plantation of exotic species was started in 1973. The plantation is thinned on an irregular basis, and several firebreaks have been established. Grazing and illegal cutting do occur within the plantation, but encroachment has been controlled.

Further reading

Ministry of Agriculture (1980).

Yangudi-Rassa National Park

Admin region Afar

Coordinates 10°52'N 41°15'E

Area 473,100 ha Altitude 400–1,459 m

ET010

A1, A3 (A08)

National Park

Site description

Yangudi-Rassa National Park is in the centre of the Afar Region (in the northern section of the Rift Valley) between the towns of Gewani and Mille, and 500 km from Addis Ababa. Yangudi mountain lies on its south-eastern boundary, and is surrounded by the Rassa plains. Habitats include riverine forests along the Awash river, marshes and small lakes, dry riverbeds, rocky hills, sandy semi-desert and wooded grasslands. The sandy semi-desert and wooded grassland make up the largest portion of the park. The two main ethnic groups inhabiting this area are the Afars and the Issas. Ethnic feuds have been frequent between them, but most of the park happens to be in an area where they avoid each other.

Birds

See Box and Table 3 for key species. More than 230 species have been recorded in this area. Being situated on an important migration flyway, many migratory species have been found including *Falco naumanni* and *Circus macrourus*, both of which are recorded regularly on migration and during the winter. Other species of interest include *Phoenicopterus minor*, *Petronia brachydactyla* and *Ardeotis arabs* (more common here than *A. kori*).

Key species

A1 *Falco naumanni*

Circus macrourus

A3 (A08) Somali–Masai biome species: 23 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

The park supports an important population of *Equus africanus* (CR), and at least 35 other species of mammal.

Conservation issues

The park was proposed in 1977 specifically to protect *Equus africanus*. Besides the wildlife, the park is also important for safeguarding a 50-km strip of rich archaeological remains along the eroded hills near the Awash river. Active management of the park's resources is minimal, with protection arising primarily as a result of the extremely harsh environment and its position as a no-man's land between rival pastoralists/ethnic groups. The military has previously killed large numbers of herbivores within the park.

Further reading

Dellelegn (1989), Hillman (1993), Stephenson (1978).

Denkoro forest

Admin region Amhara

Coordinates 10°52'N 38°46'E

Area Undefined

Altitude 2,300–3,665 m

ET011

A3 (A07)

National Forest Priority Area

Site description

Denkoro forest is in Debresina District of South Wollo Zone. It is 30 km from the District town, Mekane Selam, and 215 km from Dessie. Denkoro is a forest remnant on the eastern side of Denkoro river gorge. The forested area lies between 2,400 and 3,000 m. The lowest part is dominated by *Podocarpus falcatus*, with *Juniperus procera*, *Olea europaea cuspidata* and *Olinia rochetiana* coming in as the altitude increases. Above this, *Rapanea* and *Dombeya* begin to dominate along with *Hagenia abyssinica*. *Erica arborea* and *Hypericum revolutum* are present midway up through the forest, and gradually dominate near the top. At around 3,000 m, the forest is a pure stand of *Erica*, gradually changing to *Festuca*-dominated Afro-alpine grassland with some scattered giant *Lobelia*, *Kniphofia* sp. and also some scattered shrubby *Erica arborea*.

Birds

See Box and Table 3 for key species. During a three-day survey of a small portion of this forest, 77 species were recorded, among which were many Afrotropical Highlands biome species. Species of particular interest include *Gypaetus barbatus*, *Gyps rueppellii*, *Stephanoaetus coronatus*, *Columba larvata* and *Apaloderma narina*.

Key species

A3 (A07) Afrotropical Highlands biome: 26 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

The area supports populations of many mammal species including *Canis simensis* (CR), *Theropithecus gelada* (LR/nt), *Papio hamadryas* (LR/nt) and the endemic *Tragelaphus scriptus meneliki*.

Conservation issues

Denkoro Forest National Forest Priority Area faces a number of threats. Of particular importance is the heavy grazing of the understorey (compounded by natural events such as drought), the cutting of trees (which is often selective) for construction, farm tools and fuel, and the expansion of cultivated areas. The Afro-alpine grassland ecosystem is impacted by fire, hunting and illegal grazing. Cattle-grazing within the forest area has had a profound impact on forest regeneration. There are almost no seedlings or saplings in the forest understorey, climbers are very rare, and the herbaceous ground-cover has been grazed down to soil level. The long-term fate of the forest will be dependent on the intensity of this grazing pressure. The Forest and Wildlife Conservation section of the Agriculture Office monitors the forest and grassland. Around 37 guards patrol the area during the day. Grazing is allowed in the forest area, but totally prohibited in the Afro-alpine grassland. However, the local community is allowed to cut the *Festuca* grass every 1–2 years. It is used in construction (walls and roofing), for rope, baskets, bedding, etc. Local people are also allowed to gather dead/fallen wood from the forest. Honey is an important non-timber forest product in this area, with farmers suggesting that it is the major off-farm source of income; *Erica* and *Dombeya* are the two most important plant groups for the honeybees. Participatory resource management is being taught to the local community through social gatherings (the church, etc.) and prearranged target group meetings.

Further reading

Larsson (1998), Marino *et al.* (1999).

Awi Zone

Admin region Amhara

Coordinates 10°51'N 36°47'E

Area 131,844 ha Altitude 2,300–2,500 m

ET012

A1, A3 (A07)

Unprotected

Site description

Awi Zone is an autonomous administrative unit within Amhara Region and is governed by its local people, the Agaw, who speak

Awgni. The Zone is on the western side of the central plateau in Ankasha and Banja Weredas of what used to be called Agaw Medir near the town of Finote Selam. Agaw Medir is relatively flat and fertile with an altitude of c.2,300 m. The lowest parts are at 1,800 m and the highest at 3,100 m on the nearby hills and mountains. The area is crossed by about nine permanent rivers that drain into the Abbay (Blue Nile) and has two crater lakes, Zengena and Tirba.

The Agaw have practised a land-management system for many centuries which is well adapted to the local ecology. They plough with horses, make extensive use of irrigation and plant live hedges round their fields. They also use a wide variety of field and homestead crops and have developed local varieties to suit their conditions. Use of communal resources, particularly water and forests, is carefully controlled by the local communities. These practices have enabled the Agaw to sustain the fertility of the soil and minimize erosion so that this area is recognized as one of the most productive in the Amhara Region.

Four sites, each with different qualities and habitat-types were visited in this Zone. Each has characteristics that contribute to the overall richness of the natural biodiversity in Agaw.

Zimbiri marsh is located 5 km south-west of Addis Kidan, a town on the Kosso Ber–Bahir Dar road, at an altitude of 2,300–2,350 m. The vegetation includes short annual grasses, sedges, bulrushes and some trees such as *Croton macrostachyus*. The marshy area is very extensive, encircling a number of peasant associations that are on the slightly higher and drier ground. In some places there are narrow paths across the marsh between groups of houses, but further down the shallow valley the wet ground is extensive and forms an impassable barrier.

Zengena lake is a crater lake, 6 km south of Kosso Ber and only about 300 m from the main road. The average altitude at the rim is 2,480 m and there is a drop of nearly 1,000 m down to the bottom of the crater. Vegetation around the crater rim is dominated by a plantation of *Cupressus lusitanica* which is managed by the Agricultural Bureau in Kosso Ber. Some poorly developed natural vegetation exists inside the crater on the steeply sloping sides. The lake at the bottom is almost inaccessible, but can be reached by those who are sure-footed. The water is fresh. Excessive algal growth was not observed when looking down from the top. The lake is found in the vicinity of a rapidly growing town.

Dukima and Apini forests are located at 5 km on either side of Kidamaja town, 33 km from Kosso Ber on the Kosso Ber to Chagni road. The average altitude of the sites is 2,500 m. The plant species are diverse and indicate that the forest is disturbed or well used. Trees include acacias, figs and *Croton macrostachyus*; *Rosa abyssinica* and other shrubs typical of disturbed forest are common. The undergrowth on the upper parts of the hills is dense and forms thickets difficult or impossible to penetrate. Streams spring from the hills and join a small river at the bottom. The forests are surrounded by agricultural land that is gradually expanding on to the gentler slopes. Although the forests on the hills face a threat from expanding small-holder agriculture and grazing by domestic stock, it is interesting to note that the vegetation has existed to this date and is still in good condition. The conservation of the forests appears to be a result of traditional land management.

Goobil forest and pond is 8 km south of Kosso Ber town, beside the small town of Kesa. The natural forest is found on a dome-shaped hill at 2,400–2,500 m which is completely covered by various tree species (especially *Cupressus lusitanica*, *Cordia africana* and *Croton macrostachyus*) and a fairly dense undergrowth. There is a pond at the foot and partly encircling the eastern side of the hill. The forest and the pond have agricultural and grazing land on the western side and the small town of Kesa on the east. Cattle and other domestic stock use the mountain for grazing; several footpaths and cut trees are evidence that the forest is an important source of wood for the town below. The forest is managed by Ankasha Woreda Agriculture Bureau in Kesa town.

■ Birds

See Box and Table 3 for key species. During a survey of Awi Zone in October 1995, a total of 214 species was recorded, of which 28 belong to the Afrotropical Highlands biome. Two globally threatened species were recorded, *Rougetius rougetii* and the Ethiopian endemic *Macronyx flavicollis*. Other Ethiopian endemics recorded were *Dendropicos abyssinicus* and *Parophasma galinieri*, both highland species. Two Somali–Masai biome species, *Turdoides leucopygius* and *Petronia dentata* were noted, as well as a number of Palearctic species. Zimbiri marsh could form a suitable habitat for cranes, especially *Grus*

carunculatus. Notable birds recorded from the Dukima and Apini forests were two Afrotropical Highlands biome species—*Zoothera piaggiae* and *Cryptospiza salvadorii*. An additional three sites at Finote Selam were also surveyed, with total numbers of species as follows: Bir Sheleko State Farm 57 species (including three Afrotropical Highlands biome species), Kere State Forest 42 (1) and Geray marsh and dam 96 (2). The most striking thing about the avifauna is the very low number of highland species compared with the less-disturbed sites. Perhaps this is an indication of the vulnerability of the biome species once modern farming techniques and other developments are introduced.

Key species

A1	<i>Rougetius rougetii</i>	<i>Macronyx flavicollis</i>
A3 (A07)	Afrotropical Highlands biome: 29 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The four natural sites are not contiguous and could probably not be treated as one IBA. However, they represent diverse habitats and have a rich birdlife to justify their protection from (especially human-induced) dangers, and a closer analysis could enable at least three of the sites to qualify as IBAs in their own right. Zimbiri marsh, Dukima and Apini forests and Goobil forest and pond have a good number of Afrotropical Highlands biome species with two endemic species in the forests. Zengena forms a good site for locating a recreation centre or lodge for visitors in nice surroundings, and this idea is being contemplated by the local administration and business people.

■ Further reading

Molla (1994).

Choke mountains

Admin region Amhara

Coordinates 10°42'N 37°52'E

Area Undefined Altitude 2,800–4,070 m

ET013

A1, A3 (A07)

Unprotected

■ Site description

The Choke mountains are to the south of Lake Tana in the centre of Gojam. The nearest large towns are Bahir Dar to the north and Debre Markos to the south. The small towns of Bichena and Mota lie to the east. This large mountain block rises gradually from the surrounding plateau to around 2,800 m, with the highest peak, Mt Choke, at 4,070 m. The Abbay river has cut a deep valley that defines the eastern limits of the area. The area has an inactive volcanic centre composed of basalt with a very thin cover of pyroclastic materials (volcanic ashes). Erosion has resulted in numerous, deeply incised valleys, which were covered with glaciers during the last ice-age. Many small streams originate in the mountains. The most remarkable feature of these mountains is the virtual absence of forest. The major natural habitats are moist moorland with giant *Lobelia* spp., *Alchemilla* spp., sedges and tussocks of *Festuca* spp. and other grasses, montane grasslands and meadows, cliffs and rocky areas. Woody plants, *Erica* spp., *Hypericum revolutum* and *Arundinaria alpina* are only found in patches. Agricultural activity is extensive, with cultivation up to 3,000 m.

■ Birds

See Box and Table 3 for key species. A survey in October 1995 recorded 49 species. Species of particular note (and characteristic of open highland habitats) are *Bostrychia carunculata*, *Vanellus melanocephalus*, *Columba albitorques*, *Macronyx flavicollis* (uncommon), *Corvus crassirostris* and *Serinus nigriceps*.

Key species

A1	<i>Macronyx flavicollis</i>
A3 (A07)	Afrotropical Highlands biome: 16 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The mountains are totally unprotected and are severely threatened by the rapid agricultural expansion, overgrazing and excessive soil erosion.

Guassa (Menz)

Admin region Amhara

Coordinates 10°22'N 39°48'E

Area 106,000 ha Altitude 3,200–3,600 m

ET014

A1, A3 (A07), A4i

Unprotected

Site description

The Guassa area of Menz is in North Shewa Zone, east of the road that leads from Mezezo to Mehal Meda. The area forms part of the high-altitude plateau of the central Ethiopian highlands at the edge of the Rift Valley escarpment. The Guassa range is a water catchment area for many streams and rivers draining into the low-lying areas of North Shewa. It provides water to two major river systems, namely the Abbay (Blue Nile) to the west and the Awash to the east. The area comprises hills and valleys interspersed with swamps and open areas of montane and alpine grassland. The vegetation is Afro-montane with a diverse herb complement including tussock-grasses such as *Festuca* spp. (the Amharic name for which is Guassa). Other plants found in the area include *Erica* spp., *Helichrysum* spp., *Lobelia rhynchopetalum*, *Thymus* spp. and *Alchemilla* spp.

Birds

See Box and Table 3 for key species. This area is particularly important for *Rougetius rougetii* and *Macronyx flavicollis*, both of which occur commonly. A recent survey recorded 136 *Vanellus melanocephalus* foraging on the Afro-montane grasslands of Guassa; it was predicted that greater numbers were present. Four of the Afrotropical Highlands biome species known from the site are Ethiopian endemics, namely *Vanellus melanocephalus*, *Macronyx flavicollis*, *Parophasma galinieri* and *Serinus nigriceps*. Other species of interest include *Bubo capensis* and *Cyanochen cyanopterus* (for which there is a breeding record).

Key species

A1	<i>Rougetius rougetii</i>	<i>Macronyx flavicollis</i>	
A3 (A07)	Afrotropical Highlands biome: 27 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.		
A4i		Breeding (pairs)	Non-breeding
	<i>Vanellus melanocephalus</i>	—	136

Other threatened/endemic wildlife

This is one of the last refuges in Northern Shewa Zone for the mammal *Canis simensis* (CR).

Conservation issues

The communities around Guassa have been implementing a traditional conservation system for hundreds of years. Under this system an area is protected from all types of interference for 4–5 years, after which the communities in the neighbourhood decide that members be allowed to cut the grass for thatching and other purposes. After this, all the communities around Guassa enter the site freely and graze their cattle until the community elder closes the site again. During the period 1991 to 1996, this well-organized traditional conservation system broke down, with people continuing to graze their animals in what were supposed to be closed areas. The local communities have conserved this area of montane grassland largely for grazing purposes, but the rich growth of grass is also used for thatching and domestic products such as baskets, rope, mats and mattresses.

Further reading

Tefera (1995).

Jemma and Jara valleys

Admin region Amhara

Coordinates 10°07'N 38°56'E

Area Undefined Altitude 1,300–2,000 m

ET015

A1, A2 (115), A3 (A04, A07)

Unprotected

Site description

The Jemma and Jara are permanent rivers that flow through Northern

Shewa Zone down from Were Illu, through Merhabete and then as the Jemma river into a large gorge beside Debre Libanos and Fiche. The Jemma joins the Wenchit before reaching the Abbay (Blue Nile) (site ET016). By road and track the area is c.180 km north of Addis Ababa. The Jemma and Jara rivers are mainly difficult of access, at the bottom of steep-sided gorges that have been cut through basalt to expose the underlying large blocks of limestone and sandstone. The bottoms the valleys comprise gently sloping land, and the rivers have created gravel flood-plains of varying width. The altitude at the Jemma river-crossing is 1,300 m, and 2,000 m at the top of the gorge. Habitats comprise: the rivers, which are fairly fast-flowing; *Typha* spp. beds beside the permanent rivers; blocks of limestone that support *Sterculia africana* trees, *Tamarindus indica* and *Ficus thonningii*; the endemic *Aloe schelpii*; and acacia woodland away from the rivers and on the sides of the gorge. The sides of the gorge support extensive areas of grassland. *Acacia* woodland, the dominant vegetation in this area, is both denser and more extensive in the Jara than in the Jemma valley. There are small to medium-sized trees of *Acacia seyal*, *Commiphora* spp., *Ziziphus spina-christi*, *Combretum* spp., *Terminalia brownii*, *Grewia bicolor* and other *Grewia* spp., *Balanites aegyptica* and *Maytenus* spp. There are some large figs and larger trees of *Cordia africana* and *Syzygium guineense* by the river as well as on the sloping areas at the base of the cliffs. There is no well-developed riverine forest. Much of the valley bottom and sloping sides are cultivated with sorghum and sesame. Tef *Eragrostis tef* becomes increasingly common with altitude. The extent of cultivation is relatively smaller in Afer Bayene and Jara than in Jemma valley, where 80% of the area surveyed was cultivated. After the rainy season, when the water-level has dropped, farmers burn off the bulrushes and plant additional sorghum and some cotton in the moist black soil.

Birds

See Box and Tables 2 and 3 for key species. A survey in May 1996 found *Francolinus harwoodi* to be (apparently) more widely distributed in the Jemma valley and adjacent river systems of North Shewa Zone than was previously thought, and the species may well extend into Were Ilo, South Wello Zone; it is abundant in at least some parts of its range, with sizeable populations recorded at Jara valley (1,450–1,500 m) and Afer Bayene (1,800 m); until recently it was believed that beds of *Typha* spp. provided crucial habitat for it, but recent observations suggest this is not so. A small population of the restricted-range *Myrmecocichla melaena* is present on the precipitous, rocky escarpment sides. This area supports an interesting cross-section of biome-restricted species, including those listed below and six Somali–Masai biome species. Birds of particular interest, whose distributions extend along lowland river systems far into the highland massif, include various species normally considered restricted to the lower lands to the west of the rift, namely *Streptopelia vinacea*, *Cisticola troglodytes*, *Sporopipes frontalis*, *Lamprotornis chloropterus* and *Lagonosticta larvata*. Additionally, *Ptilopachus petrosus* frequents the rocky slopes, *Onychognathus albirostris* is fairly common on the cliffs of the escarpment and *Serinus xanthopygius* can also be found in the area.

Key species

A1	<i>Francolinus harwoodi</i>
A2 (115)	Central Ethiopian highlands EBA: Two of the four species of this EBA have been recorded at this site; see Table 2.
A3 (A04)	Sudan–Guinea Savanna biome species: Six of the 16 species of this biome known from Ethiopia have been recorded at this site; see Table 3.
A3 (A07)	Afrotropical Highlands biome: 14 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Habitat destruction is the major threat to *Francolinus harwoodi*. The birds are also hunted for food as their meat is prized both for its flavour and because it is believed to have medicinal value. There has been considerable clearance of trees and bushes to enable cultivation, and to provide wood for fuel and construction. Other natural vegetation has been cleared to reduce populations of crop-pests, particularly *Quelea* and rodents. *Typha* beds are burned annually to clear the growth so the farmers can plant cotton in the moist soil. These bulrushes are also cut to provide material for thatching, mats and

fencing, and although they have considerable powers of regeneration, the bulrush beds are being reduced.

Further reading

Ash (1978), Ash and Gullick (1989), Atkins and Edwards (1995), Cheesman and Sclater (1935), Robertson *et al.* (1997).

Mid-Abbay (Blue Nile) river basin

ET016

Admin region Amhara, Oromiya

Coordinates 10°15'N 38°52'E

Area Undefined Altitude 490–4,230 m

A1, A2 (115)

Unprotected

Site description

The Abbay (Blue Nile) is Ethiopia's largest river. It originates at Lake Tana on the central plateau, leaving the lake at Bahir Dar (site ET007) and flowing for 32 km before plunging over the basalt at Tis-Isat falls. It flows through a deep, narrow gorge that runs south and east around the Choke mountains, and then turns west into the Mid-Abbay. The Mid-Abbay flows through a magnificent gorge that widens and narrows and widens again. It crosses the border into the Sudan near Bumbadi in Benshangul-Gumuz Region. The gorge effectively divides the central plateau of Ethiopia into two blocks. The Mid-Abbay river forms the boundary between Amhara and Oromiya Regions. Major rivers that feed into the Abbay are the Bir, Temcha and Beles from the north, the Didessa, Finchaa, Guder, Muger and Wenchit from the south and the Beshlo from the east. The Jemma river (site ET015) is a tributary of the Wenchit. The vegetation of the Mid-Abbay has never been well studied, but satellite photographs show extensive areas of forest and woodland. The trees in the riverine forest of the Didessa river, at c. 1,300 m, comprise *Ficus vallis-choudae*, *Mimusops kummel*, *Tichilia emetica*, *Cordia africana* and *Phoenix reclinata*. The smaller trees include *Sapium ellipticum*, *Dracaena steudneri* and several woody climbers. It is likely that riverine forest of similar composition is found beside the Abbay river, with the addition of extensive tamarind groves and undergrowth of *Ficus capreaefolia*.

Birds

See Box and Table 2 for key species. No comprehensive species list exists for this area. However, *Francolinus harwoodi* is known to occur at a number of locations in the Mid-Abbay basin (in various places in gorges that join the river) and it may be expected to occur elsewhere in the river system in suitable scrub and thicket on hillsides. *Ptilopachus petrosus* is likely to occur on the rocky slopes. The Abbay river system is likely to be important for Sudan–Guinea Savanna biome species and others from the lowlands, as is the case with the Jemma and Jara valleys. For example, *Cisticola troglodytes*, *Serinus leucopygius*, *Streptopelia vinacea*, *Sporopipes frontalis* and *Plocepasser superciliosus* are expected to occur.

Key species

 A1 *Francolinus harwoodi*

A2 (115) Central Ethiopian highlands EBA: One of the four species of this EBA has been recorded at this site; see Table 2.

Other threatened/endemic wildlife

An endemic cricket occurs in this area, the population of which can reach pest proportions at which point it will attack cereal crops.

Conservation issues

The Mid-Abbay is poorly known because most of the area has been inaccessible to motor vehicles. It used to be mostly uninhabited because it is hot and malaria is prevalent. However, population pressure in the highlands is now forcing people to expand agricultural activities in the gorge and, wherever a road passes through, charcoal production is adopted as a major income-earner for the local people. A large sugar estate has been developed on the Finchaa river, and other areas are likely to be developed in the future. There have been proposals to establish four or five Game Reserves in the Abbay basin, but none has been officially designated, and there are currently no active conservation initiatives in the Mid-Abbay basin.

Further reading

Cheesman and Sclater (1935), Clark and Greenhigh (1952), Friis (1992), US Department of the Interior, Bureau of Reclamation (1964).

Lakes Alemaya and Adele

ET017

Admin region Oromiya

Coordinates 09°24'N 42°00'E

Areas: 772 ha Altitude 2,000 m

A4i

Unprotected

Site description

Lakes Alemaya (472 ha) and Adele (300 ha) are in Haramaya Wereda, East Harerghe Zone. Alemaya is 21 km and Adele 5 km west of the city of Harar, and both are to the north of the main Harar road. Lake Alemaya is the largest in a series of shallow lakes that include Horajutu, Adele and Finkile. These lakes formed in depressions on the otherwise relatively flat plateau. Finkile overflows seasonally into Lake Alemaya whilst Lake Adele is separated by a 15-km-wide strip of cultivated land. The lakes are surrounded by small hills and derive their water directly from rainfall and from several small streams that drain catchments to the west and north; floods from adjacent watersheds also occur. The lake shores are gently sloping so that a considerable area of land can become shallowly inundated during and immediately after the rainy season. During the 1960s, the area around much of Lake Alemaya supported thick vegetation, predominantly bushes and climbers, and the lake itself had extensive beds of sedges, reeds and bulrushes. However, most of this vegetation has been lost to agricultural conversion and the sedge/reedbeds have been greatly reduced. The major habitats now comprise open water, some areas of Cyperaceae along the shore, and extended, shallowly inundated areas that can be cultivated with vegetables. Surrounding areas have short-grass grazing-meadows and cultivated fields of sorghum. There are also some large *Eucalyptus* trees and clusters of palm trees. Water from Lake Alemaya is abstracted for irrigating perennial crops, particularly *Catha edulis*, locally distinct cultivars of *Coffea arabica*, and sugar-cane (the main rain-fed cereal is sorghum). The lake also supplies drinking water for the local people, their animals, the city of Harar and Alemaya University. The lake supports some local fishing and recreation.

Birds

See Box for key species. Numbers of *Fulica cristata* appear to be in decline, and at least fluctuate seasonally. Up to 10,000 were recorded in September 1971, many of them on nests, but only 1,000 were found in May and August of that year. A survey in October 1995 estimated a population of 300. Other waterbirds are well represented at the site, with *Phoenicopterus ruber* (1,650) and *P. minor* (1,050), a small population of *Porphyrio porphyrio* and *Podiceps nigricollis* being seasonally common. Additional counts include *Pelecanus onocrotalus* (57), *Alopochen aegyptiacus* (350), *Anas clypeata* (60), *Himantopus himantopus* (40), *Recurvirostra avosetta* (120), *Limosa limosa* (550), *Calidris minutaltemminckii* (180) and *Philomachus pugnax* (150). The surrounding area is known for its hybrid crows *Corvus edithae* × *alba*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Fulica cristata</i>	—	1,000–10,000

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The area around the lakes has been almost totally converted to agriculture, and this has been to the detriment of the local wildlife. With no controls on the farming practices (e.g. to conserve soil or water), what little soil cover there is is being eroded, resulting in the siltation of the lake. The situation is being exacerbated by the increasing abstraction of water (over 30 pumps have been installed) for irrigation, and an apparent reduction in annual rainfall. The result is that the area of Lake Alemaya in particular is diminishing. Farmers are now using areas previously covered by water to cultivate vegetables. The area between Finkile and Alemaya is naturally a haven for waterbirds, but when the level of the water decreases, the land is used for intensive grazing and agriculture. Direct disturbance has the potential to affect some species, in particular *Alopochen aegyptiacus* and *Fulica cristata* that are considered pests by local farmers. The threats to this area have been recognized by the local authorities who have recommended controls on the activities of farmers around the lake and the instigation of environmental rehabilitation activities, particularly physical and biological measures to reduce the rate of soil erosion and siltation.

Ankober–Debre Sina escarpment**ET018**

Admin region Amhara

Coordinates 09°43'N 39°46'E

Area Undefined

A1, A2 (115), A3 (A07)

Altitude 1,650–3,700 m

National Forestry Priority Area

Site description

This site comprises the extremely steep escarpment and a narrow strip of the plateau overlooking the Afar, from just north of Ankober, north to the area above Debre Sina in the vicinity of the Tarma Ber. Ankober is on an ancient route from the lowlands of the Afar up onto the central Ethiopian plateau. The topography of the area is steep and dissected by ravines and gorges through which rivers and streams tumble down the eastern escarpment of the Great Rift Valley. The altitude ranges from 1,650 m near Tach Gorebela to 3,700 m near Kundi on the plateau. Man has for a long time heavily impacted the natural vegetation of most of this area. What little natural vegetation remains is to be found on the very steep sides of cliffs and inaccessible valley bottoms. Gosh Meda is a narrow strip at the eastern edge of the plateau, where the land is mostly over 2,800 m and peaks rise to 3,500 m. The eastern escarpment begins dramatically with sheer cliffs and steep slopes up to 1,000 m high. The vegetation is moist to dry Afro-alpine moorland with some stunted *Erica arborea* and shrubby *Helichrysum* spp. in sheltered places between rocks. In the open areas, over rocks and on the cliffs, many plants (such as *Festuca* spp., other grasses and *Sedum* spp.) grow in clumps, tussocks or cushions as an adaptation to the extreme of climate. Until recently, most of the area was used only for grazing cattle and sheep. However, since the 1970s, increasing expanses of moorland have been cultivated for barley.

The best-preserved area of natural forest is in the valleys of Wof-Washa. Wof-Washa forest lies between Debre Sina and Ankober in North Shewa Zone. It covers 13,000 ha in Baso, Werana and Ankober Weredas. The forest is on very steep slopes in (mostly east-facing) narrow valleys, with altitudes ranging from 2,000 m to 3,730 m. Wof-Washa is a montane, mixed (broadleaved and conifer) forest, the main species being *Hagenia abyssinica*, *Olea europaea cuspidata* and *Juniperus procera* at the higher altitudes, with *Podocarpus falcatus* and *Allophylus abyssinicus* lower down. At c.3,000 m, *Erica arborea*, *Hypericum revolutum* and giant *Lobelia* spp. replace the large trees. There are also extensive patches of the endemic *Kniphofia foliosa*, and clumps of *Helichrysum* spp. and *Festuca* grass. The herb layer within the forest is rich in species. Attempts have been made to build a logging road, but these have failed and the only timber taken out is what people can carry. When farmers are very busy with their cultivated crops, cattle are turned into the forest to range unattended; this represents the main use of the forest. Above the forest, the main activity is subsistence farming (barley, sheep and cattle). The cultivation of fields for barley has now expanded onto the steepest slopes that used to be covered with Afro-alpine vegetation.

Birds

See Box and Tables 2 and 3 for key species. This site supports the only known population of *Serinus ankoberensis*, a species confined to areas between 2,800 m and 3,750 m along the escarpment rim from Ankober to Tarma Ber, a distance of c.20 km. *S. ankoberensis* is typically not uncommon along the broken hilltops, and on the steeply shelving, near-vertical cliffs of the escarpment. The species also makes use of land adjacent to the escarpment edge, feeding on the uneven terrain of recently ploughed land. Breeding occurs at Gosh Meda between October and February, but it may breed in any season following heavy rain. The restricted-range *Myrmecocichla melana* occurs in small numbers on rocky terrain adjacent to Gosh Meda, and in ravines and gorges at other points along the escarpment edge. Other species of interest recorded at this site include *Gypaetus barbatus*, *Buteo oreophilus*, *Falco peregrinus*, *Accipiter rufiventris*, *Tachymarptis melba*, *Schoutedenapus myoptilus*, *Hirundo rupestris* and *Monticola solitarius*.

Key speciesA1 *Serinus ankoberensis*

A2 (115) Central Ethiopian highlands EBA: Two of the four species of this EBA have been recorded at this site; see Table 2.

A3 (A07) Afrotropical Highlands biome: 24 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

Theropithecus gelada (LR/nt) is still numerous at the top of the cliffs. A population of *Canis simensis* (CR) in the high-altitude area of Ankober was last recorded in 1991.

Conservation issues

The main conservation issue of the area is the destruction of the remaining natural vegetation on the steep slopes of the mountains at the top of the escarpment. Once cleared for cropping, soil is soon washed away. Erosion started at the top could have a devastating effect on the ecosystems below. However, the farmers appear to have little choice: population pressure is forcing them constantly to expand their cropped area. The practice of planting exotic trees, particularly *Eucalyptus*, now an important cash-crop in the high-altitude areas, is further reducing the available habitat for indigenous flora and fauna. Considerable potential exists for cooperation in the conservation of the very steep slopes of the rift wall and adjacent natural vegetation above the escarpment rim. This could cover many aspects of natural forest conservation: community forestry, watershed management, soil conservation, fuelwood supply, recreation and tourism. Should the opportunity arise, the area would be ideal for the reintroduction of *Capra walia* (CR).

Further reading

Ash (1979), Ash and Gullick (1989), Atkins (1992), Collar and Stuart (1985), Gunther (1993), Ministry of Agriculture (1980).

Aliyu Amba–Dulecha**ET019**

Admin region Amhara, Afar

Coordinates 09°32'N 39°56'E

Area Undefined Altitude 1,050–1,680 m

A1, A2 (115)

Unprotected

Site description

This area is on the western edge of the Afar depression at the bottom of the Ankober escarpment. Aliyu Amba is a small town situated in Ankober Wereda. Dulecha is the Wereda capital of Zone 3 in Afar, 38 km from Ankober. The Melka Jebdu river flows between the two towns, 3 km from Aliyu Amba, with the area of importance being where the river runs alongside and then crosses the road. The Gachani and Dulecha rivers also cross this area. The main vegetation should be *Acacia*-dominated woodland, but the site is highly degraded with only a few bushes, strips of grass and farm plots. Even the riverine forest has been reduced to patches.

Birds

See Box and Table 2 for key species. This site supports a small, but apparently stable population of *Serinus flavigula*. Little is known of the ecology or distribution of this species nor whether the population at this site is contiguous with that on Fantalle mountain in Awash National Park (site ET028). Aliyu Amba–Dulecha is home to at least 15 Somali–Masai biome species, and six Afrotropical Highlands biome species, as well two species of the Sudan–Guinea Savanna biome; see Table 3. *Cercomela dubia* and *Petronia brachydactyla* have been found nearby at slightly lower altitudes and may occur in suitable habitat at this site.

Key speciesA1 *Serinus flavigula*

A2 (115) Central Ethiopian highlands EBA: One of the four species of this EBA has been recorded at this site; see Table 2.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

According to local information, no protection measures were taken in the past or have been proposed. The woodland is under high threat from fire for clearing and conversion to farmland. The wetlands of Dulecha are already under maize cultivation supplemented with irrigation. The riverine forests found along the banks of the rivers are potentially rich for bird species, although increased pressure from use by local people have reduced them to small patches.

Further reading

Ash and Gullick (1990a).

Finchaa and Chomen swamps

ET020

Admin region Oromiya

Coordinates 09°34'N 37°21'E

Area c.60,000 ha Altitude 2,200 m

A1, A3 (A07)

Unprotected

Site description

Finchaa and Chomen swamps are on the eastern border of East Welega Zone. The Zonal capital is Nekemte, 331 km west of Addis Ababa. The road to Finchaa leaves the Addis–Nekemte road at Gedo, 80 km west of Ambo town. This freshwater wetland complex is made up of two shallow swamps, Finchaa to the north and Chomen to the south, on a flat plateau. A low ridge separates them, with water flowing from Chomen into Finchaa through the ridge. Finchaa covers c.28,000 ha and Chomen an even larger area. North of Finchaa a series of small ridges separates the swamp from the Aleltu river and its tributaries, which run parallel from west to east before dropping over the basalt shelf into the Abbay gorge. The western edge of the plateau is delimited by a ridge of highland that runs north-west–south-east and divides the watershed of the Didessa river to the east from the Finchaa and Chomen swamps. A lower ridge on the east separates the swamps from the Guder river basin. The encircling highlands limit the extent of the swamps during the rainy season. The only outlet is at the north-east corner of Finchaa, where the Finchaa river falls in a long drop of nearly 500 m into the Abbay gorge. The streams flowing into Finchaa and Chomen swamps are all short, thus direct rainfall is a vital source of their water. In the dry season the water-level in the swamps is less than 1 m, but in the rainy season the level rises to 2–3 m. Water is released from the swamps at a rate controlled by the Finchaa channel between the swamp outlet and the falls. Floating vegetation covers both swamps. The most important species is the perennial stoloniferous grass *Panicum hygrocharis*, which forms floating islands. There are beds of short sedges and rushes around the swamp edges and aquatic plants such as *Nymphaea coerulea* and *Persicaria* spp. in patches of open water. The surrounding land is quite heavily cultivated, but there are extensive areas of grassland where clumps of *Phoenix reclinata* are a conspicuous feature on the ridges. Higher areas have remnant forest patches (some now reduced to lone trees) with *Podocarpus falcatus*, *Cordia africana* and large *Ficus vasta*. In the gorge, the vegetation changes into woodland of *Combretum* spp., *Terminalia* spp. and other small trees, with large stands of *Oxytenanthera abyssinica*. Immediately below Finchaa this vegetation has been cleared for large-scale sugar-cane agriculture. The local Oromo farmers keep large numbers of cattle. No use of the swamps by the local people has been reported. Finchaa has developed into a small town associated with one of the country's most important hydroelectric power plants. The dam and power-station were built in the early 1970s.

Birds

See Box and Table 3 for key species. This site is primarily important for *Grus carunculatus*. Reports from local people suggest that *Grus carunculatus* may breed in the swamps of Finchaa and Chomen. During a recent survey, two *Grus carunculatus* were noted, but numbers may be considerably higher, since only a small area of the swamp was surveyed. Small numbers of *Rougetius rougetii* are resident in the area. The Afrotropical Highlands biome species known from the area include *Cyanochen cyanopterus* and *Oriolus monacha*. Other interesting species recorded recently are *Gypaetus barbatus*, *Pandion haliaetus* and *Balaerica pavonina*.

Key species

A1	<i>Grus carunculatus</i>	<i>Rougetius rougetii</i>
A3 (A07)	Afrotropical Highlands biome: 18 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Although the swamps cover a large area, they are very shallow and any disturbance that reduced the flow of water into them and/or increased evapotranspiration from the area would have serious consequences for the swamp, its wildlife and the surrounding agriculture. Expanding the area of cultivation poses the threat of

increased siltation that would reduce the water-holding capacity of the area. The increased use of fertilizer and other agrochemicals requires careful monitoring as this could have devastating effects on the ecological balance of this aquatic system.

Further reading

Ethiopian Wildlife and Natural History Society Survey Team (1996), Harza Engineering Company (1966).

Berga flood-plain

ET021

Admin region Oromiya

Coordinates 09°16'N 38°23'E

Area Undefined Altitude 2,450–2,500 m

A1, A3 (A07), A4i

Unprotected

Site description

Berga flood-plain is in Ada Berga District (Wereda) of West Shoa Zone. It lies 75 km west of Addis Ababa and c.24 km north of Holeta town. It is part of the vast plains on the Central plateau of Shoa, in the Ethiopian North-western Highlands. The Berga river, the main tributary of the Awash river, drains the plain. The vegetation of the Berga flood-plain comprises grasses, sedges and other plants peculiar to these areas, e.g. *Trifolium* spp. (including the endemic *T. schimperi* and *T. calancephalum*), *Haplocarpha schimperi*, *H. hastata*, a *Cerastium* sp., *Cyperus* spp. (including *C. dichroostachyus*, *C. atronervatus* and *C. atroviridis*), *Ranunculus multifidus*, *R. simensis*, *Rumex natalensis*, *R. marginulata*, *Uebelinia kigesiensis*, *Schoenopletus corymbosus*, *Vossia cuspidata* and *Habenaria filicornis*. The most important and palatable grasses in this area are species of *Pennisetum* and *Andropogon*. As on the Sululta plain (site ET024), there are places where water lies up to 50 cm deep, and such areas are often covered with floating grasses, particularly *Odontelytrum abyssinicum*, and pondweeds *Potamogeton* spp., and often have the purple flower spikes of *Aponogeton abyssinicus* emerging from the surface.

Birds

See Box and Table 3 for key species. This site is important for a number of globally threatened species, but is particularly so for *Sarothrura ayresi*. Currently, Sululta plain (site ET024) and Berga flood-plain are the only known locations for this species in Ethiopia, and together account for over 65% of the global population. The species was rediscovered at Sululta in 1995 and then at this site in 1997, when 200 adults were estimated to be present. The first ever nest (with six eggs) was found in August 1999, confirming that the species breeds at this site. Other threatened species include *Grus carunculatus* (uncommon, with a pair recorded in August 1998), *Rougetius rougetii* (an uncommon resident on the river banks), *Macronyx flavicollis* (not uncommon) and *Gallinago media* (autumn passage migrant of unknown abundance). The open plains are a very important feeding and breeding area for *Cyanochen cyanopterus*, with more than 260 recorded in August 1998. *Vanellus melanocephalus* also occurs in good numbers as the plains dry out. More than 700 *Bostrychia carunculata* have been counted in parts of the plains during the 1998 waterfowl census. Over 100 species have been recorded at this site.

Key species

A1	<i>Sarothrura ayresi</i>	<i>Rougetius rougetii</i>
	<i>Grus carunculatus</i>	<i>Macronyx flavicollis</i>
A3 (A07)	Afrotropical Highlands biome: 18 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Bostrychia carunculata</i>	700
	<i>Cyanochen cyanopterus</i>	260

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Unlike neighbouring valleys, the valley where *Sarothrura ayresi* has been found is not cropped for hay. Whether there are factors that make harvesting in this area problematic is unknown, but any changes in land-use could have severe implications for the productivity of *Sarothrura ayresi*. Chicks hatched at the end of the rainy season are particularly vulnerable.

Further reading

Atkinson *et al.* (1996), Collar and Stuart (1985), Collar *et al.* (1994), Masselli-Novelli (1986), Mengistu and Tadesse (1998), Taylor (1997).

Bisidimo

Admin region Oromiya
Coordinates 09°11'N 42°17'E
Area Undefined Altitude 1,400 m

ET022

A1

Unprotected

Site description

Bisidimo is in East Hararge Zone. It lies in the Erer valley, about 22 km ESE of Harar town at the end of a turnoff from the road to Jijiga. The area is a semi-arid plain at around 1,400 m surrounded by a chain of rocky hills. The vegetation of the area was probably *Acacia* woodland and grassland on the plain, and *Acacia* bushland on the slopes. However, no systematic study of the plants of the area has ever been carried out. The non-native *Lantana camera*, *Opuntia ficus-indica* and *O. dillenii* have invaded large sections of the hillsides. In the early 1970s, there were fairly extensive beds of *Typha* spp. by the Erer river, but these have now been reduced to a small area and nearly the whole valley in the vicinity of Bisidimo is cultivated or occupied by the settlement associated with the nearby leprosarium. The local people are mainly Muslims.

Birds

See Box for key species. *Serinus xantholaema* was collected at this site in 1912, but has not been recorded since. A survey in 1995 recorded 83 species, of which nine were Somali–Masai biome species. A longer survey would undoubtedly increase the species list.

Key species

A1 *Serinus xantholaema*

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Most, if not all, of the Bisidimo area has been turned into farmland and settlements. Many of the woody plants have been removed for construction and firewood, and field clearance. Exotic plants such as *Ceiba pentandra* and those mentioned above have been introduced to the area. Use of pesticides for killing mosquitoes and *Quelea quelea* has probably adversely affected the fauna. However, the local people are strongly against the killing of birds. The local ecology will have changed significantly since *Serinus xantholaema* was collected in 1912.

Further reading

Ash and Gullick (1989), Collar and Stuart (1985), Erard (1974), von Madarasz (1912).

Entoto Natural Park and escarpment

Admin region Addis Ababa
Coordinates 09°11'N 38°45'E
Area 13,000 ha Altitude 2,600–3,100 m

ET023

A3 (A07)

Private Reserve

Site description

Entoto Natural Park lies on the south-eastern slopes of Mt Entoto, between the northern limit of the city of Addis Ababa (at c.2,600 m), and the track along the mountain ridge (at over 3,100 m). This track forms the border between Addis Ababa and Oromiya Regions, and divides two large watersheds, that of the Abbay (Blue Nile) to the north and the Awash to the south. The mountain is formed from a tilted block of bedrock that has left very steep, soil-less slopes and cliffs on the northern side, and much longer, shallower slopes on the south-eastern side. The natural vegetation is Afro-montane forest and, where drainage is impeded, woodland with open meadows. The forest would have been dominated by *Juniperus procera* with groves of *Olea europaea cuspidata*, scattered *Hagenia abyssinica*, *Hypericum revolutum*, *H. quartianum*, *Podocarpus falcatus* and *Acacia abyssinica*, with *A. negrii* in some of the more disturbed valleys. *Erica arborea* appears at altitudes above 3,000 m. Shrubby areas include species with fleshy fruits like *Rosa abyssinica* and *Carissa edulis*, which attract fruit-

eating birds. The number of herbs, both in the undergrowth of the forest and in the meadows, is very large and includes a number of endemics, particularly clovers. The whole Entoto mountain range (and many of those around it) has been covered with *Eucalyptus* plantations. Farmers on Entoto cultivate barley and raise cattle and sheep. Despite the close proximity to the city, their system of farming has been little affected by modern inputs. Thus the habitats in the park are diverse: forest, bushland, cultivated fields, grassy meadows, rocky slopes and cliffs, streams and marshes.

Birds

See Box and Table 3 for key species. So far, 115 species have been recorded from Entoto Natural Park and escarpment (although over 200 are known or likely to occur). Two of these, *Dendropicos abyssinicus* and *Parophasma galinieri*, are Ethiopian endemics. *Vanellus melanocephalus*, *Macronyx flavicollis* and *Serinus nigriceps* may occur occasionally in the montane grasslands, as they are known from similar habitat nearby. Also, as the natural vegetation is restored, it is likely that more species, such as *Poicephalus flavifrons*, which is known from nearby Menagesha State Forest (site ET031), will move into the park. The park is an excellent place for watching vultures (with five species present), as well as eagles, buzzards and hawks, larks and ravens. Of particular interest are *Gypaetus barbatus* (a notable population exists in the Entoto and Gofu hills), *Buteo oreophilus*, *Bubo capensis* (historical records only), *Aquila wahlbergi* and *Accipiter rufiventris*. There is a substantial *Gyps rueppellii* roost. Many Palearctic and intra-African migrant species use the park.

Key species

A3 (A07) Afro-tropical Highlands biome: 33 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The Ethiopian Heritage Trust runs the park, having leased the area from Addis Ababa Region (in 1995) on the understanding that the Trust will develop the area as a natural park to be used by the people of Addis Ababa as well as visitors. However, as the park is not part of the government's official protected-area system, the Trust has to raise all the funds needed to develop and run it. The fast-growing *Eucalyptus* trees suppress the growth of nearly all the indigenous woody and herbaceous plants and severely reduce the biodiversity of any area where they are planted in dense stands. Removal of timber, twigs and leaves (for fuel and to sell—this is the main source of fuel for Addis Ababa) has left the soil in many areas of the park greatly impoverished and vulnerable to erosion. *Eucalyptus* trees demand large quantities of water, and areas that were previously seasonally wet and supporting a distinctive flora and fauna have now dried up. Streams used to be perennial, but now they only flow for a short period after the rains stop. One of the aims of the Ethiopian Heritage Trust is to restore an enriched natural forest in the park area, and the rainy seasons of 1995 and 1996 have seen extensive plantings of indigenous tree seedlings. The northern slopes and cliffs of Entoto are currently outside the park boundaries, but it is hoped that they will be incorporated into the park sometime in the future. Many people depend on the park for their livelihood; their needs will have to be accommodated as the park develops.

Further reading

Atkins (1996b), Blanck and England (1995).

Sululta plain

Admin region Oromiya
Coordinates 09°12'N 38°43'E
Area Undefined Altitude 2,500 m

ET024

A1, A3 (A07), A4i

Unprotected

Site description

The Sululta plain is on the north-east side of Entoto mountain in North Shewa Zone. The village of Sululta is about 20 km north of Addis Ababa. The plain is a wide, shallow valley almost completely surrounded by mountains from which many small rivers drain, feeding

the Muger river that flows north-west into the Abbay (Blue Nile). Sululta plain is swampy with some quite large areas of open water in the rainy season, but it reverts to grazing land during the dry months. The surrounding mountainsides were covered with forest dominated by *Juniperus procera*, and the lower slopes supported groves of *Acacia* spp. However, most of the hillsides around Sululta are now covered with plantations of *Eucalyptus*, with only odd native trees remaining, except for the groves protected by the Ethiopian Orthodox Church. The vegetation on the Sululta plain comprises grasses, sedges and other species such as the endemic *Trifolium schimperi*, *Haplocarpha schimperi* and *Cerastium* spp. The most important grasses are *Pennisetum* spp. and *Andropogon* spp. In some areas the water reaches 50 cm deep, and such areas are often covered with floating grasses, particularly *Odontelytrum abyssinicum*, *Potamogeton* spp. and *Aponogeton abyssinicus*. The riverbanks are better drained than the surrounding areas and thus support small bushes, scramblers and the occasional tree. The highland areas surrounding the valleys are intensively cropped. Crop production is heavily dependent on a large population of cattle, which provide oxen for ploughing, and manure that is put on selected fields. The wide valleys provide these cattle with important grazing. Sedges and rushes are used extensively to cover the floors of houses. In Sululta, the farmers cut and bale the mixture of grasses, sedges and herbs, and sell it to the numerous dairy farmers in Addis Ababa.

■ Birds

See Box and Table 3 for key species. Between July and October, 10–15 pairs of *Sarothrura ayresi* breed at one seasonal wetland, the only location currently known for the species in Ethiopia. *Rougetius rougetii* is an uncommon resident which has apparently declined, possibly due to changing land-use. However, the population of *Macronyx flavicollis* is stable, and the bird is not uncommon. *Gallinago media* occurs on passage from July to October in the flooded grassland, with *Crex crex* occasionally recorded in autumn from less flooded areas. *Circus macrourus* is fairly common on spring and autumn passage, with small numbers wintering. Sululta is an important feeding area for *Cyanochen cyanopterus*, with between 35 and 850 recorded. Up to 120 *Vanellus melanocephalus* have been found as the plains dry out, especially between October and January. More than 150 *Bostrychia carunculata* have been counted in some areas, although many more may be present at times. Between October and February, there are 2,000–4,000 waterbirds in one small area of inundation. Other species include *Parophasma galinieri*. *Hirundo lucida* breeds, and there is a good passage of *Emberiza hortulana* in October–November.

Key species

A1	<i>Sarothrura ayresi</i>	<i>Gallinago media</i>
	<i>Rougetius rougetii</i>	<i>Macronyx flavicollis</i>
	<i>Circus macrourus</i>	
A3 (A07)	Afrotropical Highlands biome species: 25 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Bostrychia carunculata</i>	—
	<i>Cyanochen cyanopterus</i>	—
	<i>Sarothrura ayresi</i>	10–15
	<i>Vanellus melanocephalus</i>	—
		120

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The farmers of Sululta use modern machinery to harvest the vegetation in the short period after the rains when the soil has dried out enough and the grasses have started flowering, but before the frost burns the plants (which can happen as early as the end of October). The valley where *Sarothrura ayresi* has been found is not harvested in this way, but it may only be a matter of time before it is, which will in turn compromise the survival of chicks hatched at the end of the rainy season. The Sululta wetland has become an important environmental education area for high-school students and teachers, although educational activities need to be developed with the local people to help ensure the long-term survival of the avifauna.

■ Further reading

Atkinson *et al.* (1996), Collar and Stuart (1985), Collar *et al.* (1994), Masselli-Novelli (1986, 1988), Taylor (1996).

Gudo plain

Admin region Oromiya

Coordinates 09°08'N 38°35'E

Area Undefined Altitude 2,760 m

ET025

A1, A3 (A07), A4i

Unprotected

■ Site description

Gudo plain is in Welmera District (Wereda) of West Shoa Zone. It is c.25 km west of Addis Ababa, and just 12 km north-west of Gefersa Reservoir (site ET027). Gudo plain is part of the vast plains on the Central plateau of Shoa, in the Ethiopian North-western Highlands. Small streams, tributaries of the Sibilu river, drain this marshy area. The Sibilu drains into the Muger river. The vegetation of Gudo plain comprises grasses, sedges and other plants peculiar to these areas, such as *Trifolium* spp. (including the endemic *T. schimperi* and *T. calancephalum*), *Haplocarpha schimperi*, *H. hastata*, a *Cerastium* sp. and various *Cyperus* spp. Chains of wetlands close to Gudo (namely Kiro, Danisa and Riqate), offer similar habitats, and are equally threatened.

■ Birds

See Box and Table 3 for key species. This site is of particular importance for its large population of *Vanellus melanocephalus*. *Rougetius rougetii* is resident but in small numbers, and *Macronyx flavicollis* is considered fairly uncommon.

Key species

A1	<i>Rougetius rougetii</i>	<i>Macronyx flavicollis</i>
A3 (A07)	Afrotropical Highlands biome: Seven of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	
A4i	Breeding (pairs)	Non-breeding
	<i>Vanellus melanocephalus</i>	—
		210

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Gudo and the other nearby valley-bottom marshes are heavily grazed. The plain is divided into small plots among community members. Cattle are confined to their owners' plots during the rainy season, but animals graze throughout the area during the dry season. Horses are allowed to graze freely. As grazing is constant, no hay crop is (or can be) taken.

Chilimo forest

Admin region Oromiya

Coordinates 09°05'N 38°10'E

Area 2,400 ha Altitude 2,300–3,000 m National Forest Priority Area

ET026

A3 (A07)

■ Site description

Chilimo forest is in Western Shoa Zone close to Ghinchi town, Capital of Dendi District, and 90 km west of Addis Ababa. This area is at the western end of a chain of hills and ridges that stretches 200 km from north of Addis Ababa westwards up to the Ghedo Highlands. River valleys and gorges cut through the hills. Chilimo forest is one of the few remnants of dry Afro-montane forest that remain on Ethiopian Central Plateau. The vegetation throughout this area has been subject to human impact for over 2,000 years (longer than in any other East African country), and the rate of deforestation has been extremely high, with significant changes in forest cover observed even since the 1970s. The forest is montane mixed broadleaf–coniferous, although conifers predominate. The main species in the canopy are *Juniperus procera*, *Podocarpus falcatus*, *Prunus africana*, *Olea europaea cuspidata*, *Apodytes dimidiata* and *Ficus* spp. Historically, this entire upland area is thought to have been covered by *Juniperus–Podocarpus* forest, but most of the forest has been cleared for agriculture, and this encroachment continues. Selective cutting of trees for commercial use stopped about 1973, but illegal cutting by the local people continues. Various types of shrubland now dominate the landscape. The forest is important to local people for grazing their animals. A few shrub species dominate, such as *Myrsine africana*, with others like *Maytenus arbutifolia* and *Rubus apetalus* abundant indicators of forest disturbance. Small patches of plantation forests, initiated by the Forestry Department of the State in 1976, are present within the forested lands. Indigenous and exotic species are

used, the main exotic species being *Eucalyptus saligna*, *E. camaldulensis*, *Pinus patula* and *Cupressus lusitanica*, with indigenous ones including *Juniperus procera*, *Hagenia abyssinica* and *Podocarpus falcatus*. Chilimo forest is threatened by excessive exploitation and conversion to other land-uses.

■ Birds

See Box and Table 3 for key species. A total of 150 bird species has been recorded at this site, five of which are Ethiopian endemics, and many more are Afrotropical Highlands biome species. Of interest among the biome species are *Bostrychia carunculata*, *Agapornis taranta*, *Tauraco leucotis*, *Lybius undatus*, *Zoothera piaggiae*, *Pseudoalcippe abyssinica*, *Parophasma galimieri*, *Parus leucnotus*, *Oriolus monacha*, *Corvus crassirostris*, *Poeyoptera stuhlmanni*, *Onychognathus tenuirostris*, *Cinnyricinclus sharpii*, *Cryptospiza salvadorii* and *Serinus nigriceps*. Chilimo forest supports populations of many other important birds including *Accipiter melanoleucus*, *A. tachiro*, *Buteo buteo*, *B. oreophilus*, *Aquila pomarina*, *A. verreauxii*, the poorly known *Kaupifalco monogrammicus* and the forest specialist *Stephanoaetus coronatus*.

Key species

A3 (A07) Afrotropical Highlands biome: 34 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

The endemic *Tragelaphus scriptus meneliki* occurs. A significant number of Afro-montane endemic tree and shrub species occur at this site, along with the Ethiopian endemics *Erythrina brucei*, a tree species which occurs in more open and inhabited areas, and the shrub *Acanthus sennii*.

■ Conservation issues

Chilimo forest was heavily exploited during the 1940s. There were about six sawmills in the area, at Jumjum, Gaji, Bejiro and Chilimo, and as a consequence there is virtually no forest at any of these sites except for Chilimo and part of Gaji. In 1982, a large area of land embracing Chilimo, the nearby Gaji forest and surrounding woodland were designated as Chilimo-Gaji National Forest Priority. However, conversion of forest to other land-uses and illegal cutting of trees for local use and timber remain the major threats. In 1982, the forest area was surveyed at 22,000 ha. A recent (late 1990s) inventory by the Forest Inventory Team of Oromiya Natural Resources Development and Environmental Protection (NRDEP) Bureau suggested the total had been reduced to c.12,000 ha. This reduction is confirmed by a comparison of aerial photos from 1980 and 1994 that revealed a loss of c.50% of forested land. The actual forest-cover of Chilimo area is now only c.2,400 ha.

■ Further reading

Demel (1996), Ethiopian Wildlife and Natural History Society Survey Team (1996), FARM Africa (1996), Tadesse (1998), Tadesse *et al.* (1999), Tamrat (1993, 1994), Zerihun and Backäus (1991).

Gefersa reservoir

Admin region Addis Ababa

Coordinates 09°03'N 38°38'E

Area 5,700 ha Altitude 2,600 m

A1, A3 (A07), A4i

Enclosed: officially protected

ET027

■ Site description

Gefersa reservoir is 18 km west of Addis Ababa (by road) in West Shewa Zone. Although within Oromiya Region, Addis Ababa Water and Sewage Authority have administrative control of the area. The reservoir is in a shallow basin about 10 km wide, stretching between the Wechacha and Entoto mountains. The Gefersa river and its feeder streams are part of the Akaki river catchment. The reservoir formed behind a main dam built in 1938 (and modified in 1954) and a second, smaller dam, built in 1966, upstream from the main dam; the water-storage capacities are c.6,500,000 m³ and c.1,500,000 m³ respectively, and the two dams control a catchment area of c.5,700 ha. The reservoirs supply treated water to Addis Ababa. The reservoirs themselves are virtually free of large aquatic plants, probably due to the constantly fluctuating water-level. Patches of sedge occur where permanent streams flow into the reservoirs, and on the western and

southern sides of the main reservoir, long, shallow valleys with small streams support swampy vegetation. The area immediately around the dam and on the northern side of the reservoir is enclosed and supports well-established exotic trees of *Eucalyptus globulus*, *Cupressus lusitanica*, *Pinus patula* and *P. sylvestris*. Meadows in this enclosure have been protected from grazing for many years and have developed a flora quite different from the heavily used areas outside. Much of the area surrounding the reservoirs has been closely planted with *Eucalyptus*, although there are some patches of small trees, e.g. *Maesa lanceolata*, *Buddleja polystachya* and *Maytenus obscura*, the climbers *Clematis simensis* and *Jasminum abyssinicum* and also bushes of *Rosa abyssinica*. All other areas are densely inhabited and farmed. The valley bottoms are used as pastureland that floods in the rainy season, while the higher slopes are cultivated, with barley and wheat the main crops, and smaller areas of pulses (field pea and faba bean) and oil crops (niger seed and linseed).

■ Birds

See Box and Table 3 for key species. *Sarothrura ayresi* occurred before the swamp was developed into a reservoir, but it almost certainly no longer does so. *Rougetius rougetii* is present in small numbers, however. The edges of the reservoir form a good habitat and suitable feeding ground for a sizable population of *Cyanochen cyanopterus*. Away from the water, grassland species such as *Macronyx flavicollis* can be seen (in small numbers), and *Serinus nigriceps* often occurs. The woodland around the reservoir supports a further range of Afrotropical Highlands biome species. A good variety of Palearctic and Afrotropical ducks and geese occur at Gefersa, the most common Afrotropical species being *Cyanochen cyanopterus* (maximum monthly average, August, 154).

Key species

A1 *Rougetius rougetii*

Macronyx flavicollis

A3 (A07) Afrotropical Highlands biome: 20 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

A4i

Breeding (pairs)

Non-breeding

Cyanochen cyanopterus

—

100+

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The site supplies the water needs of Addis Ababa and is officially protected by Addis Ababa Water and Sewage Authority. In the past, the main reservoir was completely enclosed by a wire fence, with people and domestic animals forbidden to enter. However, farmers in the surrounding area felt they had been deprived of water-use and grazing rights, and now herds of domestic animals graze around the reservoir. Agricultural activities on a small scale are also seen in the area. Both grazing and cultivation around the reservoir are a health hazard, and therefore undesirable. The farmers greatly resent geese and ducks, which come to their fields and feed on cereal crops. The high rate of siltation is a major long-term problem for the reservoir, as it severely affects the capacity of the reservoirs and results in a shortage of usable water for Addis Ababa. Effective erosion control would have to be implemented throughout the catchment area. The *Eucalyptus globulus* plantations are also a problem: the species is well known to deplete soil and groundwater by absorbing it with its wide lateral and deep vertical roots.

■ Further reading

Urban (1991).

Awash National Park

Admin region Oromiya, Afar

Coordinates 09°00'N 39°55'E

Area 75,240 ha Altitude 750–2,007 m

A1, A2 (115, s063), A3 (A08)

National Park

ET028

■ Site description

Awash National Park lies either side of the main Addis Ababa–Assab highway between the towns of Metahara and Awash Station. Most of the park, including the headquarters, is in Arsi Zone of Oromiya Region, but a northern section extends into Afar Region. The

headquarters are 95 km east of Nazaret and 225 km east of Addis Ababa. Fantalle mountain, a semi-dormant (but still smoking) volcano rising to 2,007 m, dominates the northern half of the park. The mountain is bounded by the Sabober plains (at about 900 m) to the west, the Addis Ababa–Assab highway and Awash river to the south and east, and the Filwoha springs and Kesem river to the north. Awash National Park is in one of the most geologically active regions of the world. The results of eruptions from Fantalle mountain dominate the park landscape. Lava-flows, cinder cones, deep fissures, steam vents and other volcanic features can be seen throughout. Recent volcanic activity has resulted in the eruption of fresh lava from several fissures, and one such lava-flow crosses the main highway near Lake Beseka. Grassland, savanna and shrubland dominate the park. Grasslands are found within the crater and on the slopes of Fantalle mountain as well as on the surrounding plains. Inside the crater and on the crater rim the dominant grass is the tall tussocks of *Cymbopogon* sp., intermixed with small shrubs including a *Lavandula* sp., a favourite food of the endemic *Serinus flavigula*. The perennial tussock-grass *Chrysopogon plumulosus*, a highly palatable and important species for domestic and wild grazing animals, dominates all the remaining grassland areas. Much of the grassland in the north and west of the park is overgrazed, resulting in up to 50% bare soil and rock and the domination of invasive, unpalatable species such as needle grass *Aristida* spp. Lowland *Acacia* spp. (*A. tortilis*, *A. senegal*, *A. nilotica*) and *Balanites aegyptiaca* are the most common of the large trees in the savanna, while the shrubby and very spiny small *Acacia* spp. (*A. nubica* and *A. mellifera*) dominate overgrazed areas. Shrubby areas around the grassland are more mixed with some *Acacia*, *Grewia* spp., *Psiadia incana* and *Vernonia* sp. The riverine forest supports figs, *Dobera glabra* and *Syzygium guineense*, which have large fruits attracting many birds and mammals. The Filwoha hot springs are surrounded by an almost pure stand of *Hyphaene thebaica* with *Sporobolus consimilis* and *S. spicatus* on the saline soil. On the nearby lava-flows are several trees of the Somali–Masai restricted species, *Moringa peregrina*. In the early 1970s, Lake Beseka covered only 3.3 km². By 1990 it measured 35 km² with a maximum depth of 10–12 m. This recent steady increase has required the road and rail lines on the lake's northern side to be raised several times, and historically the lake has expanded to more than 10 times its present size. The present increase has been attributed to an inflow of fresh water from irrigation and rainwater run off. Details of the park's vegetation, birds and socio-economics are documented in Jacobs and Schloeder (1993).

■ Birds

See Box and Tables 2 and 3 for key species. Over 460 species have been recorded. *Serinus flavigula* is not uncommon (over 35 birds) on Fantalle mountain where a very small population of *Cercomela dubia* can also be found. Both *Falco naumanni* and *Circus macrourus* occur in small numbers during spring and autumn passage, with some individuals of both species overwintering. Other passage species include *Aquila heliaca* (rare) and *Acrocephalus griseldis* (uncommon). Nearly half the Somali–Masai biome species occur in the park. Of particular note are *Pterocles decoratus*, *Caprimulgus stellatus*, *Mirafra gilletti*, *Cisticola cinereolus*, *Cisticola bodessa*, *Lanius somalicus* and *Onychognathus salvadorii*. The park is situated on a major flyway for Palearctic migrants, with large numbers of warblers and other species moving south through the area in September. Many species, and large numbers, of waterbirds have been recorded from the park—though some of these were probably recorded from Lake Beseka which, when it was much smaller and probably less chemically contaminated, was more productive than it is currently. During the early 1970s, the eastern side of the lake was sometimes covered in flamingoes. The presence of an as-yet-undescribed *Hirundo* cliff swallow, and an unidentified *Serinus* (with a white rump) suggests that the avifauna of the park is far from completely known. In addition, three species of the Sudan–Guinea Savanna biome also occur; see Table 3.

Key species

A1	<i>Falco naumanni</i>	<i>Cercomela dubia</i>
	<i>Circus macrourus</i>	<i>Serinus flavigula</i>
A2 (115)	Central Ethiopian highlands EBA: One of the four species of this EBA has been recorded at this site; see Table 2.	
A2 (s063)	Northern Ethiopia Secondary Area: <i>Cercomela dubia</i> has been recorded at this site.	

A3 (A08) Somali–Masai biome species: 51 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

A total of 76 mammal species (including bats) has been recorded. *Alcelaphus buselaphus swaynei* (EN) was reintroduced in 1974. *Equus grevyi* (EN) used to occur but its current status is unknown. *Papio hamadryas* (LR/nt) occurs, interbreeding with *Papio anubis* in a 5-km-long hybrid zone along the Awash river (above the Awash falls).

■ Conservation issues

Awash National Park was established in 1966 (primarily to protect the threatened mammals) and received legal status in 1969. The area has received much attention in the past and now has c.180 km of tracks, an airstrip, headquarters (including a small museum), staff buildings, a caravan hotel and a campsite to cater for visitors. Unlike many of the other parks, the infrastructure at this site was not destroyed during the upheavals in 1991, largely due to the efforts of the park staff to develop a healthy dialogue with the local peoples. However, the park management faces many problems of which the most important has been and still is the inter-tribal conflict between the traditional rights of the Kerreyu, Afar and Itu pastoralists for dry-season grazing and access to water, and the absence of adequate alternatives or compensation for these people. Human pressure is escalating (there are several permanent settlements in the park), and the various tribal groups and their animals have moved into much of the park (but mostly on the west and northern sides). Fires are frequent. Pollution of the Awash river and Lake Beseka from a sugar estate and other large-scale irrigated farms upstream is a problem and needs to be monitored. Similarly, the road and the railway, which bisect the park, are hazardous for the animals, provide easy access for poachers, and should be monitored.

■ Further reading

Atkins and Harvey (1994, 1996), Balcha *et al.* (1984), Berhanu *et al.* (1976), Gibson (1967), Hillman (1993), Jacobs and Schloeder (1993), Madge and Redman (1989), Woodrooffe and Associates (1990), Stephenson (1976).

Akaki–Aba–Samuel wetlands

ET029

Admin region Oromiya

Coordinates 08°52'N 38°04'E

Area 12,068 ha Altitude 1,900 m

A1, A4i, A4iii

Unprotected

■ Site description

The Akaki–Aba–Samuel wetlands are part of the Awash river catchment, c.20 km south-east of Addis Ababa. The wetlands consist of Aba–Samuel reservoir and an adjacent area that is inundated most of the year. The Akaki river consists of two main branches, the confluence of which is at the Aba–Samuel reservoir. The western branch of the river rises north-west of Addis Ababa on the flanks of Wechacha mountain and flows for c.40 km before it reaches the reservoir. The eastern branch of the river rises north-east of Addis Ababa and flows into Aba–Samuel reservoir after c.53 km. The reservoir was created in 1939 to produce electricity for Addis Ababa, and production continued until 1970 when the machinery became too old to maintain and the plant stopped working. Aba–Samuel reservoir catchment area is 1,495 km², and includes the catchment of the Lege Dadi dam. The reservoir originally had an area of 12,068 km², but the catchment has suffered much erosion resulting in silt deposition in the reservoir that has also been invaded by *Eichhornia crassipes*. Both of these factors have severely reduced the area of open water. The area around Akaki–Aba–Samuel is permanently marshy with small ephemeral lakes. The fringe of the marsh has some tall sedges, grasses and reeds. The rest of the area is farmland and grassland with a few scattered trees, mostly *Faidherbia albida* and figs.

■ Birds

See Box for key species. Akaki is important for wintering waterbirds, over 20,000 occasionally being present, with high numbers noted for *Phalomachus pugnax* (max. 3,671), *Anas clypeata* (max. 1,119) and *Phoenicopterus minor* (1,750). Resident waterbirds occurring in

numbers include *Pelecanus onocrotalus*, *Mycteria ibis*, *Phoenicopterus ruber*, *Alopothen aegyptiacus*, *Anas undulata*, *Himantopus himantopus* and *Vanellus spinosus*. *Balearica pavonina* also occurs at Akaki, and *Eupodotis melanogaster* can occasionally be seen in the area, particularly from May to July. Globally threatened species include *Crex crex* (rare), *Aquila clanga* (rare), *Falco naumanni* (present in small numbers on passage, with a few possibly overwintering) and *Grus carunculatus* (present occasionally, in small numbers). At least seven Afrotropical Highlands biome species are known to occur at Akaki. However, the most important species is *Grus grus*, which has a wintering population that uses the area for roosting and feeding, especially from November to late February/March. Up to 8,600 individuals have been recorded at Akaki. The population of *G. grus* is not limited to the Akaki lakes: other substantial numbers occur in the Debre Zeit and Koka lake areas. These probably form part of the same population as is found at Akaki, with birds foraging on post-harvest crop stubble as far away as Melka Konture and Bu-i to the west, Koka lake in the south, and north/north-east of Debre Zeit.

Key species

A1	<i>Phoenicopterus minor</i>	<i>Grus carunculatus</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Bostrychia carunculata</i>	—	100+
	<i>Grus grus</i>	—	8,600
A4iii	More than 20,000 waterbirds have been recorded at this site.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

This site is unprotected. Most of the vegetation cover has either been cleared for cultivation or is intensively grazed. This has resulted in high erosion rates and the consequent silting up of the reservoir. The areas closest to Akaki town are being used for irrigated agriculture, particularly vegetables for the growing urban market. This is a profitable use of land and is likely to expand at the expense of the wetlands. Local farmers dislike *Grus grus* as flocks arrive when cereal crops are close to being harvested. Cranes can decimate some crops, and are particularly fond of sorghum, to such an extent that farmers in areas where cranes are regular visitors have had to abandon sorghum cultivation and use other crops such as maize. Farmers also dislike ducks and geese, particularly *Alopothen aegyptiacus*, which feed on young cereal crops and leafy vegetables. Any conservation activity will have to help the farmers either protect their crops or obtain compensation for damage from waterfowl and cranes.

Further reading

ENEL CIE/TO-Italy (1987), Syvertsen (1995a, b, 1996).

Dilu Meda (Tefki)

Admin region Oromiya

Coordinates 08°53'N 38°27'E

Area c.9,000 ha Altitude 2,080 m

ET030

A1

Unprotected

Site description

Dilu Meda is east of the Addis–Woliso road, 35 km south-west of Addis Ababa in the Becho plains, West Shewa Zone. The Zonal capital is Ambo, 125 km due west of Addis Ababa. Tefki is a village on a small raised area next to the road that crosses the plains. Dilu Meda and an adjacent area, the Geber Meda, are basins within the wider Becho plains. They comprise flat, seasonally inundated land crossed by the Awash river and surrounded by volcanic hills. Two peaks, Wato Dalecha (2,505 m) and Debel (2,421 m) are situated to north and south respectively of Dilu Meda. Two small rivers, the Sendafa and Dulolo Dilu, feed directly into Dilu Meda. Flood water from the Awash and Holeta rivers covers a large area of the basin from July to September. There are no sizeable beds of bulrush or tall sedges, but a variety of smaller sedges have been found in flooded areas along with *Potamogeton* spp. and *Persicaria* spp. Uncultivated grassland around the flooded areas is rich in species, including a number of endemic *Trifolium* spp. The farming community has developed a sophisticated system for using this difficult area. The soils, with the annual enrichment of silt and alluvium, are rich and can be cropped year after year with

cereals, particularly teff and durum wheat. Other crops well adapted to grow on residual moisture are chickpea and grass-pea.

Birds

See Box for key species. This site has been extremely important for *Grus carunculatus*, with most sightings at Dilu Meda during July–November. In the 1960s, large numbers were occasionally recorded, with up to 63 noted on one occasion, but most often 10–15 birds were present. More recently the numbers have decreased, with maximum counts of six in 1992 and eight in 1993. In August–September 1996, no birds were found, in spite of extensive searches, though four were seen in November that year. The large rodent population in the dry season attracts raptors. *Circus macrourus* is fairly common during spring and autumn passage, and some birds overwinter with *C. pygargus*. Small numbers of *Falco naumanni* pass through on spring and autumn passage, with a few apparently wintering. *Buteo augur* and *Falco tinnunculus* are present nearly all year. There is one record of *Aquila clanga*. Other birds known to occur, particularly during July–September, when the Awash river floods, include *Pelecanus onocrotalus* (in substantial numbers), *Platalea alba* and *Mycteria ibis*. The area is also important for a variety of other wading birds as the waters recede. From late October, up to several hundred *Grus grus* forage on crop stubble. Small numbers of *Balearica pavonina* are regularly recorded, and the site is visited by migrant *Ciconia nigra*. Small numbers of *Macronyx flavicollis* are resident.

Key species

A1	<i>Grus carunculatus</i>	<i>Macronyx flavicollis</i>
	<i>Circus macrourus</i>	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Both *Grus carunculatus* and *G. grus* feed on ripe grain (teff) in October–November and are chased from crop fields during this time. The inundation of Dilu Meda during the main rainy season is hazardous for the people and reduces the total amount of land available to cultivation. The Dilu Meda area is now densely settled and intensively used. A management feasibility study of the Becho plains has suggested a range of options to control flooding and increase the area available for cultivation. The option that may be implemented involves constructing a dyke, widening existing river channels, improving the Dulolo river flow and creating a drainage network in Dilu Meda. Complete drainage would reduce the area of suitable land available to *Grus carunculatus* and other waterbirds. It is currently understood that flood-control measures will only be implemented on Dilu Meda, leaving Geber Meda intact. The almost total destruction of the grassland and swamp has encouraged the spread of invasive weeds such as *Amaranthus spinosus*, which has vicious spines on both the plant and the fruit and is a major hazard to the feet of people and animals.

Menagesha State Forest

Admin region Oromiya

Coordinates 08°50'N 38°34'E

Area 9,248 ha Altitude 2,200–3,385 m Natural Forest Priority Area

ET031

A3 (A07)

Site description

Menagesha State Forest is in West Shewa Zone. It is on the south-western slopes of Mt Wechecha and can be reached via either the Jimma or Ambo roads. Mt Wechecha is a massive (3,385 m) extinct volcano. The mountainsides are generally steep with ravines cut by streams and rivers. The southern base of the mountain is at c.2,200 m and flanks the Becho plains. Menagesha State Forest covers 9,248 ha, and in 1990 plantation forest comprised 1,316 ha and natural forest 2,720 ha, the remainder being open farmland, grazing and bare land. The natural forest is dominated by *Juniperus procera* that grows to c.30 m, and forms a relatively open canopy. *Olea europaea cuspidata*, *Allophylus abyssinicus*, *Maytenus* spp. and *Euphorbia ampliphylla* form the understorey, and some *Podocarpus falcatus* trees are scattered throughout the forest. At higher altitudes, smaller *Juniperus procera* are mixed with *Erica arborea*, *Rosa abyssinica* and the endemic *Jasminum stans*. Two giant herbs, *Lobelia gibberoa* and *Solanecio gigas* dominate the sides of the valleys,

while the striking *Scadoxus multiflorus* carpets the forest floor. The area all around Menagesha forest is intensively but traditionally farmed, for livestock and crops. The forest is popular with visitors.

■ Birds

See Box and Table 3 for key species. The site holds a particularly high number of Afrotropical Highlands biome species, among which are three Ethiopian endemics, *Agapornis taranta*, *Dendropicus abyssinicus* and *Parophasma galinieri*. Other highland species of interest include *Tauraco leucotis*, *Lybius undatus*, *Zoothera piaggiae*, *Pseudoalcippe abyssinica*, *Oriolus monacha*, *Cinnyricinclus sharpii* and *Onychognathus tenuirostris*. Also of notes are *Stephanoaetus coronatus* (which breeds), *Apaloderma narina* and *Poicephalus flavifrons*.

Key species

A3 (A07) Afrotropical Highlands biome: 27 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Due to its close proximity to Addis Ababa, Menagesha State Forest has a long history of exploitation and reforestation. As early as the fifteenth century the forest was degraded and then replanted with *Juniperus procera* on the orders of Emperor Zera Yacob. In the 1900s, large-scale removal of wood for fuel and construction was noted, with logging continuing until 1955, at which time strict protection was put in place and had been maintained until recently. Reforestation started as early as 1949, when logging operations were still in full swing. Since 1991, local people have increasingly exploited the forest. Uncontrolled felling of trees continues unabated and is of major concern for the conservation of the forest. The wood is sold in the nearby towns of Sebeta and Holeta. Wood for construction and fuel is taken to Addis Ababa where there is a high demand. Ironically, the recently rehabilitated Menagesha Forestry Training Centre, in the middle of the forest, is being used to train regional forestry staff in forest conservation and management. Other groups also use the centre for workshops, and with improved (all-weather) access to the forest it could be used throughout the year as a major environmental education centre for Addis Ababa. The 1-ha tree nursery in the village of Suba produces seedlings (both exotic and indigenous) to replant the forest and surrounding areas.

■ Further reading

Forest Inventory, Demarcation and Management Plan Division (1991), Demissew (1988), Gilbert (1970), Hillman (1993).

Bishoftu lake

Admin region Oromiya

Coordinates 08°48'N 39°00'E

Area 93 ha Altitude 1,800–1,900 m

ET032

A1

Unprotected

■ Site description

Bishoftu is one of a number of crater lakes near Debre Zeit in East Shewa Zone, 50 km west of the zonal capital, Nazaret. Like all of the volcanic crater lakes in this area, Bishoftu is a closed system, surrounded by very steep and rocky hills and cliffs. The lake is fed directly by rain and by water flowing down from the crater rims. The maximum and minimum depths are 87 m and 55 m respectively. The water is alkaline, with the erosion of basaltic and hyper-alkaline rocks surrounding the lake playing an important role in increasing the alkalinity of the water. The lake does not have enough of a shoreline to attract wading birds. Cliffs and scattered trees that grow on these cliffs make up the major habitats surrounding the lake. The phytoplankton is dominated by blue-green algae, particularly *Microcystis aeruginosa* and *Oscillatoria* spp., and there are some fish, although not much fishing is done. Drier slopes around the lake support various *Acacia* spp. where disturbance and grazing are minimal. Severely eroded areas are either bare or carry highly drought-tolerant shrubs, scramblers and succulents, the most conspicuous of which are *Carissa edulis*, *Euphorbia tirucalli*, *Pterolobium stellatum*, *Caesalpinia spinosa* and *Opuntia ficus-indica*. Debre Zeit is an important

town, with a local agriculture-based economy. The market is a major feeder market for Addis Ababa. The town has a number of training and research centres, with the Air Force, the Ethiopian Management Institute Conference Centre, National Veterinary Institute, Faculty of Veterinary Medicine of Addis Ababa University, and Alemaya University of Agriculture all represented. A flourmill, a tannery, and a number of modern agricultural enterprises, particularly for chicken and egg production, have been established, and the area is a popular weekend resort for people from Addis Ababa.

■ Birds

See Box for key species. Bishoftu is one of the most important of the crater lakes in the Debre Zeit area. It supports, along with the other lakes, a wintering population of 10–15 *Aythya nyroca*. Two surveys in January 1996 recorded 50 species, including *Phoenicopterus minor*, *Netta erythrophthalma*, *Anas clypeata* and a number of migrant passerine species. *Gyps rueppellii* roost, and are believed to nest, in the rocky hills that surround the lake. In addition, one species of the Sudan–Guinea Savanna biome also occurs; see Table 3.

Key species

A1 *Aythya nyroca*

Phoenicopterus minor

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Bishoftu Lake is used as a waste outlet for effluent from a newly installed tannery, which is also pumping water from the lake. A deep-water well has been dug within the compound of the tannery, and it is feared that this may slowly drain the lake from underground. The legality of the well has been questioned. The tannery and a new hotel were built on sites that were previously designated ‘green areas’, in spite of the availability of other more convenient sites in the immediate vicinity. Some of the houses built around the crater rim, and the hotel, release their waste-water and sewage into the lake. However, people still swim and wash their clothes at various sites round the shore.

■ Further reading

Belay *et al.* (1986), Brook Lemma (1994), Ministry of Natural Resources Development (1995), Mohr (1961), Talling and Wood (1988).

Chelekleka lake and swamp

Admin region Oromiya

Coordinates 08°51'N 38°58'E

Area Undefined Altitude 1,800–1,900 m

ET033

A1, A4i, A4iii

Unprotected

■ Site description

Chelekleka is a seasonally inundated pan, the western and south-western sides of which form the periphery of Debre Zeit town. Debre Zeit is in East Shewa Zone, 50 km west of the zonal capital, Nazaret. Chelekleka is in a shallow pan into which fresh water seeps and flows from the surrounding cultivated slopes. Water fills the muddy depression during the rainy season and persists well into the dry season. The two highland ranges of Teltele and Sofa, on the north-eastern side of the swamp, are the main catchments for Chelekleka. Because of its shallow nature, the lake’s shoreline is wide. The size of the inundated area varies dramatically from year to year, although recently the size of the swamp has been reduced through the construction of flood-control dykes in the feeder streams, and channeling run-off from the town into Bishoftu lake (site ET032). The swamp is relatively rich in aquatic vegetation, with *Typha* spp., sedges, rushes, *Potamogeton* spp., *Persicaria* spp. and the floating grass *Odontelytrum abyssinicum*. The area around the lake is intensively used. As the waters retreat, peasant farmers cultivate vegetables on the rich alluvial soils left behind on its northern and eastern sides, and it is not uncommon to see some cultivation throughout the year. A thriving private citrus farm exists on the lake’s southern side. This wetland is also an important watering point for cattle in the area. Debre Zeit is an important town (see site ET032).

■ Birds

See Box for key species. This lake is important for the large concentrations of waterfowl that it supports on a seasonal basis,

including a substantial wintering population *Grus grus* that is assumed to be part of a larger population wintering in the Debre Zeit, Koka and Akaki area. Chelekleka supports, along with the other Debre Zeit lakes, a wintering population of 10–15 *Aythya nyroca*. Numbers of *Phoenicopterus minor* present on the lake are known to fluctuate unpredictably. *Circus macrourus* is fairly common on spring and autumn passage, with small numbers overwintering. *Aquila heliaca* and *Aquila pomarina* have been reported during autumn migration. A survey in February 1996 recorded substantial numbers of waterbirds, including *Tachybaptus ruficollis* (150+), *Bubulcus ibis* (1,800+), *Phoenicopterus minor* (3,000+), *Alopochen aegyptiacus* (1,000+), *Plectropterus gambensis* (250+), *Fulica cristata* (300+), *Philomachus pugnax* (500+), *Anas acuta* (300+), *Anas querquedula* (200+), *Anas clypeata* (500+) and *Netta erythrophthalma* (150+), as well as smaller numbers of *Nettapus auritus* and *Thalassornis leucotis*. There is one record of *Vanellus leucurus* from Chelekleka.

Key species			
A1	<i>Aythya nyroca</i>	<i>Phoenicopterus minor</i>	
	<i>Circus macrourus</i>		
A4i		Breeding (pairs)	Non-breeding
	<i>Grus grus</i>	—	2,500+
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds seasonally.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The swamp is filling with silt from the surrounding farmland, and the total amount of water reaching the lake has been reduced because floods from the town that used to end in Chelekleka have now been diverted to Bishoftu lake (site ET032). It is likely that fertilizer and pesticide residues pollute the water and mud of Chelekleka (as a result of farmers being encouraged to change their production techniques). The high-yielding crop varieties currently being promoted require high doses of artificial fertilizer and crop-protection chemicals that could easily become concentrated in the water and mud of the lake and swamp. Several large-scale poultry farms are now established to the west of the lake. It is not known how and where the effluent and other waste materials from these farms are being disposed of. If they are discharged into Chelekleka, this could be a major threat to the people, animals and wildlife that use the area. The practice of capturing wildfowl, especially *Alopochen aegyptiacus*, to sell to non-Ethiopians has been going on for many years, but may be increasing now as more expatriate visitors are seen in the area. It has also been suggested that a few people hunt coot and ducks. However, the majority of Ethiopians follow the Orthodox Christian or Muslim faiths that prohibit the eating of waterbirds.

Further reading

Belay *et al.* (1986), Brook Lemma (1994), Ministry of Natural Resources Development (1995), Mohr (1961), Talling and Wood (1988).

Green Lake		ET034
Admin region	Oromiya	
Coordinates	08°51'N 39°06'E	A1, A4i, A4iii
Area	54 ha	Altitude 1,800–1,900 m
		Unprotected

Site description

Green Lake is one of a number of crater lakes near Debre Zeit in East Shewa Zone, 50 km west of the zonal capital, Nazaret. Like all of the volcanic crater lakes in this area, Green Lake is a closed system, being fed directly by rain and by water flowing down from the crater rims. The maximum depth is 32 m, and the water is highly alkaline. The lake is encircled by an almost continuous crater wall with steep and, in places, precipitous slopes rising almost 200 m above the water. Cliffs and scattered trees that grow on these cliffs make up the major habitats surrounding the lake. Drier slopes around the lake support various *Acacia* spp. where disturbance and grazing are minimal. Severely eroded areas are either bare or carry highly drought-tolerant shrubs, scramblers and succulents, the most conspicuous of which are *Carissa edulis*, *Euphorbia tirucalli*, *Pterolobium stellatum*, *Caesalpinia spinosa* and *Opuntia ficus-indica*. The water exclusively supports an abundant population of the blue-green alga *Spirulina platensis*, as a result of

which the water appears green (hence the name of the lake). The dense algal growth in the lake produces a huge amount of oxygen during the day, but at night photosynthesis ceases, the algae use up the oxygen, and the lake becomes almost completely anaerobic by daybreak. This phenomenon partly explains the absence of fish from the lake. Debre Zeit is an important town (see site ET032).

Birds

See Box for key species. This lake is important for the large concentrations of waterfowl that it supports on a seasonal basis. Recent surveys have recorded c.80 species, including a range of Palearctic and Afrotropical waders, ducks and geese. Green Lake supports, along with the other Debre Zeit lakes, a wintering population of 10–15 *Aythya nyroca*. Of particular importance are the substantial numbers of *Phoenicopterus minor* known to use the lake: over 25,000 (including 2,000 dead birds) were recorded during a survey in November 1995, though a second survey in October 1996 found only 25. Other significant waterbird counts include *Tachybaptus ruficollis* (500 in 1995, 250 in 1996), *Anas clypeata* (700) and *Himantopus himantopus* (300).

Key species			
A1	<i>Aythya nyroca</i>	<i>Phoenicopterus minor</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Phoenicopterus minor</i>	—	25,000
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds seasonally.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Increasing numbers of people and cattle from the surrounding area are using Green Lake, accelerating erosion and degradation of the crater's steep slopes, and there is now excessive disturbance of the birds. There is also an increasing level of deliberate persecution of birds by local herdsman, but whether this is responsible for the 2,000 dead *Phoenicopterus minor* noted in 1995 has not been confirmed. The dramatic decline in numbers of *P. minor* noted between 1995 and 1996, combined with the die-off noted above, is a serious cause for concern, and one that should be investigated to determine the cause. The local farmers would prefer to avoid the steep and treacherous descent to the lake for their cattle if alternative sources of water were available. During the rainy season they take their cattle to other watering points, away from the lake, suggesting that if there were an alternative watering-site for cattle, the farmers would not interfere with the wildlife of the Green Lake area.

Further reading

Belay *et al.* (1986), Brook Lemma (1994), Ministry of Natural Resources Development (1995), Mohr (1961), Talling and Wood (1988).

Babille Elephant Sanctuary		ET035
Admin region	Oromiya	
Coordinates	08°45'N 42°38'E	A3 (A08)
Area	678,900 ha	Altitude 1,000–1,750 m
		Wildlife Sanctuary

Site description

Babille Elephant Sanctuary lies between Harar City and Jijiga town (22 km east of the city) in East Harerghe Zone. This huge Sanctuary extends south from the small town of Babille in the direction of Fik. Five major rivers, the Gobebe, Erer, Dakota, Borale and Fafen, flow southwards through the Sanctuary to drain into the Wabi Shebelle river. The valleys formed by the Erer, Dakota and Fafen rivers are significant physical features within the Sanctuary. There are also ridges and small plateaus, or plains, between the watersheds. Most of the area comprises sandstone with limestone in places, as around Fik. The Fafen and other river valleys were apparently once covered in dense bushland, but this has been cleared or much reduced as more and more pastoralists have taken up crop cultivation. The people in this area are traditionally pastoralists, but population pressure is forcing increasing numbers into a more sedentary existence. In the 1960s, there were some swampy patches beside the rivers, but a subsequent major lowering of the water-table in many of the valleys has probably adversely affected these wetlands. The hillsides and small

plateaus are covered in *Acacia* bushland mixed with succulents such as *Euphorbia* spp. and *Adenia aculeata*, particularly on the limestone. The plateaus are mainly covered in grasses with scattered bushes.

■ Birds

See Box and Table 3 for key species. A preliminary survey in 1995 found 106 species, including 24 Somali–Masai biome species, of which *Mirafra gilletti* and the little-known *Turdoides aylmeri* are the most noteworthy. The threatened *Serinus xantholaema* is known from two specimens collected nearby at Bisidimo, but its presence has not yet been confirmed within the sanctuary. However, local people recognize the species from illustrations, and claim to know it well from areas in the sanctuary adjacent to Fik.

Key species

A3 (A08) Somali–Masai biome species: 27 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

An endemic elephant subspecies, *Loxodonta africana orleansi* (EN) occurs in the sanctuary. The lions *Panthera leo* (VU) are notable for their black manes.

■ Conservation issues

The Sanctuary was set up in the late 1970s to provide protection to the endemic elephant subspecies and other large mammals. Even though it is one of the largest officially protected areas in Ethiopia, the protection and management it has received has been minimal. The elephants have continuously been disturbed and, in the past, damage to local farms has resulted in their persecution. Incursions of refugees and their livestock from neighbouring Somalia are also threatening the natural resources of the area. Much of the area has now been taken over by farming communities and large fruit farms are seen along the valleys. Tree-cutting is another threat to the site. Many of the local people are aware of the deterioration of their resources, but with increasing numbers of refugees to accommodate there appear to be few alternatives.

■ Further reading

Ash and Gullick (1989), Collar and Stuart (1985), Erard (1974), Imperial Ethiopian Government Natural Resources Commission (1974), von Madarasz (1912), Osborne (1990), Sime (1993), Tilahun *et al.* (1996).

Jibat forest

Admin region Oromiya
Coordinates 08°42'N 37°22'E
Area 32,000 ha
Altitude 2,000–3,000 m

ET036

A1, A3 (A07)
National Forest Priority Area

■ Site description

Jibat forest is in Nono District of Western Shoa Zone, c.200 km west of Addis Ababa. The majority of the forest is at 2,000–3,000 m, although the south-western portion extends to lower altitudes where the forest takes the form of a mosaic of small woodlands and farmland. The forest is believed to be secondary in nature, primarily due to the existence of a ruined palace found in bamboo forest near the top, which probably dates back to settlers who lived there during the fifteenth century. The forest has also been heavily exploited in more recent years for commercial timber production, although the sawmill in the forest now lies disused. Continued illegal logging and total deforestation of some areas by settlers from the north is causing significant damage and is preventing the forest from achieving its natural climax state. The two dominant tree species in this area are *Juniperus procera* and *Podocarpus falcatus*. Additionally, *Hagenia* and *Rapanea* species, characteristic of the highest-altitude forest zone, are well developed in this forest. At the forest edge, where human influence is the most pronounced, pioneer tree species such as *Bersama abyssinica* and *Clausena anisata* are common.

■ Birds

See Box and Table 3 for key species. At least 81 species are known to occur in Jibat forest and surrounding areas. This total includes *Rougetius rougetii* and significant numbers of biome-restricted species. Species of particular interest include *Buteo oreophilus*, *Poicephalus flavifrons*,

Tauraco leucotis, *Lybius undatus*, *Dendropicos abyssinicus* and *Parophasma galinieri*.

Key species

A1 *Rougetius rougetii*
A3 (A07) Afrotropical Highlands biome: 33 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Jibat forest is considered one of the National Forest Priority Areas. The remnant forest should be protected to ensure the integrity of the watershed. However, Jibat is one of the most highly exploited forests in the Central highlands. It was the main source of timber for the sawmill in Ambo town, the zonal capital, and still suffers a high level of illegal cutting (for local use and timber) and conversion to other land-uses. Settlers from northern Ethiopia have clear-cut areas in the south-western part of the forest.

■ Further reading

Tamrat (1993, 1994).

Tiro Boter–Becho forest

Admin region Oromiya
Coordinates 08°10'N 37°10'E
Area 85,804 ha
Altitude 1,650–3,018 m

ET037

A1, A3 (A07)
National Forest Priority Area

■ Site description

Tiro Boter–Becho forest lies in Tiro–Afeta and Limu–Kosa Weredas of Jimma Zone, 80 km south-west of Welkite town, which in turn is 150 km from Addis Ababa. It lies along a volcanic mountain ridge, running almost north to south, and rising to a series of small peaks, the highest of which is 3,018 m. The mountains are drained by the Gilgel Gibe to the west, which forms a wide valley supporting the lower parts of the forest, and the main Gibe river to the north and east. The Tiro Boter–Becho forest is a mixed coniferous–broadleaf forest, fairly species-rich, and structurally diverse. *Acacia* woodland dominates the lowest altitudes, with high montane forest on the slopes and in the valleys up to around 2,500 m. Above this is a mixed coniferous forest, comprising *Juniperus procera*, *Hagenia abyssinica* and other small trees, that grades into an open *Erica arborea* zone around 3,000 m. There are some patches of *Arundinaria alpina* in wet, sheltered valleys. *Aningeria adolfi-friderici* are the largest trees and are sought-after for their timber. Although the Tiro Boter–Becho forest covers 85,804 ha of forest and forest land, in 1988 only 15,957 ha was undisturbed forest, the remainder comprising 23,289 ha of disturbed forest and 46,558 ha of plantation and bushland.

■ Birds

See Box and Table 3 for key species. So far 122 species have been recorded. *Macronyx flavicollis* is uncommon, being restricted to a few small grassland patches. Notable among the biome-restricted species are *Dendropicos abyssinicus*, *Pseudoalcippe abyssinica*, *Cryptospiza salvadorii*, the little-recorded *Poeoptera stuhlmanni*, *Onychognathus tenuirostris*, *Cinnyricinclus sharpii* and *Serinus xanthopygius*. Other species of interest include *Accipiter rufiventris*, *Apaloderma narina* and four little-recorded species, *Emberiza affinis*, *Schoenicula brevirostris*, *Coracina pectoralis* and *Lagonosticta rubricata*. In addition, one species of the Sudan–Guinea Savanna biome has been recorded; see Table 3.

Key species

A1 *Macronyx flavicollis*
A3 (A07) Afrotropical Highlands biome species: 32 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Since 1984, the Tiro Boter–Becho Integrated Forest Development and Utilization Project has aimed to ensure optimum protection,

conservation and utilization of the natural forest based on the principle of sustained yield production for the benefit of local use and the national economy. The project is one of the few well-managed forestry projects in Ethiopia, and offers practical training across the full range of forestry activities. One part of the natural forest has been set aside for total protection, being used only as a reference area for studying the flora and fauna and making comparisons with the areas under forest management. However, the forest has been exploited since 1951, with 5,400–6,400 ha of *Juniperus procera* already harvested. Current threats to the vegetation come from neighbouring communities, with people grazing livestock in the forest, clearing areas for cultivation and cutting trees for construction timber and fuel (for their own use and to sell). The practice of planting fast-growing exotic trees in the grassland and woodland areas also represents a threat.

Further reading

Chaffey (1978), Forest Management Planning Division (1989), Friis (1992), Petterson (1986).

Mount Zuquala

Admin region Oromiya

Coordinates 08°32'N 38°51'E

Area 42,580 ha Altitude 2,000–3,000 m

ET038

A3 (A07)

Unprotected

Site description

Mount Zuquala is in East Shewa Zone, 74 km south-south-east of Addis Ababa. It is an isolated volcanic cone which rises to 3,000 m from the surrounding plain at around 2,000 m. This extinct volcano is on the western edge of the Great Rift Valley, and can be seen easily from Addis Ababa. A monastery is situated in the north-eastern portion of the caldera. There is a lake at the bottom, and the surrounding slopes support dry montane forest dominated by *Juniperus procera*, with some patches of *Olea africana cuspidata* and grassland. The extent of forest is c.197 ha, the grassland c.31 ha and the lake surface c.39 ha. The lake is surrounded by *Typha* spp., sedges and rushes, and is only disturbed where the monks and nuns collect water. The grassland along the east shore is seasonally inundated and the grasses grow tall before being cut for thatch. There is also an area of dry grassland, rich in grass and herb species. The forest is diverse, with 217 species of flowering plants and ferns recorded. The forest adjacent to the grassland is the richest, with several tree species beside the dominant *Juniperus procera* and *Olea africana cuspidata*, namely *Ilex mitis*, *Pittosporum viridiflorum*, *Buddleja polystachya* and *Maytenus obscura*. The canopy is open, providing light for a rich herb flora as well as the climbers. Only *Juniperus procera* is found on the steeper slopes and this gives way to *Erica arborea* on the western half of the crater rim. Near the monastery there are trees up to 25 m tall and on the southern side some trees reach 35 m, but elsewhere they are more stunted. The forest is rich in epiphytic lichens that collect moisture from the mist that often gathers around the summit of the mountain. The outer slopes near the top of the mountain are more gently sloping and support grassland, farming activities and a village community. Lower down, the slopes become very steep and are broken up by a series of ravines. There is a small plantation of exotic trees on the eastern slope, but otherwise the only trees are those in the village, on some terraces between older fields, and in the ravines. The rest of the area comprises heavily grazed shrubby grassland.

Birds

See Box and Table 3 for key species. The site holds a particularly high number of Afrotropical Highlands biome species including *Bostrychia carunculata*, *Cyanocheen cyanopterus*, *Agapornis taranta*, *Tauraco leucotis*, *Lybius undatus*, *Dendropicos abyssinicus*, *Thamnolaea semirufa*, *Parophasma galinieri*, *Parus leuconotus*, *Onychognathus tenuirostris*, *O. albirostris* and *Cinnyricinclus sharpii*. Other birds of interest include small numbers of *Oxyura maccoa* and several other Afrotropical waterfowl species, small numbers of various Palearctic ducks and small wintering populations of various Palearctic passerine migrants. There is a small roosting population of *Gyps rueppellii*, and *Aquila verreauxii*, *Jynx ruficollis* and *Monticola solitarius* occur.

Key species

A3 (A07) Afrotropical Highlands biome species: 22 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The Orthodox monastery dedicated to Abba Gebre Menfes Kidus (usually called Abbo) protects the area inside the crater, including the lake. The local farming community was also involved in protecting the area until the mid-1970s, but they are now somewhat in conflict with the monastery on the use of the forest and access to the lake and its surrounding grassland. After this conflict arose, more people moved into the village and the area of cultivation outside the crater was increased. People also started to encroach on the forest, grazing their animals and cutting down the smaller trees to build houses, as a consequence of which there is now little evidence of *Juniperus procera* regeneration in the forest. The people's greatest need is wood for building and fuel; a small plantation of some 18 ha has been created, but many more fast-growing trees are needed. The Orthodox monastery is anxious to get more support for its conservation work. In 1995, the Ethiopian Evangelical Church Mekane Yesus and the Lutheran World Federation/World Service had an integrated rural development project for the Zuquala area.

Further reading

Hylander and Hylander (1995).

Koka dam and Lake Gelila

Admin region Oromiya

Coordinates 08°30'N 39°00'E

Area 18,400 ha Altitude 1,750 m

ET039

A1, A4i, A4iii

Unprotected

Site description

Koka dam and Lake Gelila are on the Awash river in East Shewa Zone, 75 km south-east of Addis Ababa. The road to the dam is a 10-km track to the south of the main Mojo–Nazaret road. The shores of Lake Gelila can be reached via the Great Rift Valley road from Mojo to Meki, which passes over the Awash river about 20 km south of Mojo. Koka dam was built to provide hydroelectric power and came into operation in 1960. The resulting freshwater lake, Lake Gelila, has an area of c.180 km², and originally had a storage capacity of 1,850 million m³, although sedimentation has reduced this by 35%. The other main habitats are the surrounding farmland, an area of partly protected woodland beside the dam site, and the river and hot-spring area below the dam. Lake Gelila and its shoreline used to be fairly clear of vegetation, but *Eichhornia crassipes* has invaded the area and is spreading rapidly. As a result of crop cultivation the only large trees that are left in the area are figs, e.g. *Ficus vasta* and a few others generally associated with churches or other ceremonial places. The main activity in the area is farming and the most widely grown crop is *Eragrostis tef*. The farmers using the alluvial soil around the lake also grow horticultural crops and pulses, particularly haricot beans.

Birds

See Box for key species. *Falco naumanni* and *Circus macrourus* occur on spring and autumn passage, the latter fairly commonly. Numbers of *Phoenicopterus minor* fluctuate unpredictably. Several thousand *Grus grus* overwinter on the adjacent open plain and arable farmland. *Acrocephalus griseldis* was recorded regularly in small numbers between 1969 and 1976. Other species include *Phoenicopterus ruber*, *Recurvirostra avosetta* and *Charadrius asiaticus*. *Larus cachinnans* and *L. ichthyaetus* occur in small numbers, while tens of thousands of *Motacilla flava* and *Hirundo rustica* use the site. In addition, one species of the Sudan–Guinea Savanna biome has been recorded at this site (see Table 3).

Key species

A1	<i>Phoenicopterus minor</i> <i>Circus macrourus</i>	<i>Acrocephalus griseldis</i>
A4i		Breeding (pairs) Non-breeding
	<i>Grus grus</i>	— 1,000+
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds on a regular basis.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The greatest threat to Lake Koka itself is sedimentation. Recent studies show the rate of sedimentation to be 25 million m³ annually. The highly polluted Great and Little Akaki rivers are considered serious threats to the fisheries of Lake Gelila. Water from the Akaki river collects in the now-disused Abamuel reservoir and thus some of the pollutants may settle out before the water is discharged into the Awash river and then into Gelila. Over-fishing is an increasing problem. *Hippopotamus amphibius*, baboons and jackals are regarded as pests that damage crops. *Grus grus* is also seen as a serious pest as it arrives when crops are ripe and can strip fields of their grain. The people used to grow sorghum, but this has had to be abandoned because of the crane. *Alopochen aegyptiacus* is also a pest of cereals.

Further reading

Halcrow and Partners (1989a, b).

Baro river

Admin region Gambella

Coordinates 08°20'N 33°37'E

Area Undefined Altitude 400–850 m

ET040

A1, A4i, A4iii

Unprotected

Site description

The site is the course and flood-zone of the 448 km Baro river. Along with its tributaries, the river dominates Gambella Region. The Baro is the only navigable river in the country: during the rainy season traders used to travel by boat between Gambella town and Khartoum in the Sudan. The Baro meets the Pibor river to the west of Jikawo. During the rainy season the river floods to form the huge inundated area to the east and south of Jikawo, previously penetrating as far as Abobo and Gog to the east and south-east.

Birds

See Box for key species. In the dry season, when the Baro river is low, huge numbers of storks and other waterbirds (including pelicans, herons, egrets, etc.) gather to rest on sandbars in the river. A flock of 500 *Glaucous nordmanni*, apparently wintering, was noted at Jikawo in January 1970. *Balaeniceps rex* was recorded from swamps 20 km west of Gambella in the early 1960s, and was also found 60 km west of the western perimeter of Gambella National Park, west of Gog, in 1973. There is an unconfirmed 1996 report of *B. rex* breeding in the vicinity of Nasir in West Nile province, Sudan, adjacent to Jikawo, and large numbers have been reported from the Baro river system in Sudan, suggesting that the species may be present on the Ethiopian side of the border close to Nasir. During March 1976, thousands of *Anastomus lamelligerus* were recorded between Itang and Jikawo, and similar numbers of *Ciconia abdimii* were found between Pukwo and Jikawo. The latter species is thought to be an irregular non-breeding visitor.

Key species

A1	<i>Balaeniceps rex</i>	<i>Glaucous nordmanni</i>	
A4i		Breeding (pairs)	Non-breeding
	<i>Anastomus lamelligerus</i>	—	1,000+
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds on a seasonal basis.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The water of the Gambella plain rivers is of sufficiently high quality to be considered suitable for domestic water-supply and agricultural irrigation. There is currently only limited water abstraction, primarily for domestic purposes. A large and detailed master plan for the Baro–Akobo basin has been developed and some aspects are being implemented. The plan focuses on the development of irrigated agriculture for industrial crops like sugar-cane and cotton, and the application of fertilizers, herbicides and pesticides will result in the build-up of chemical residues in the soil and river/swamp water. The master plan suggests several mitigation measures such as the establishment of water-conservation zones and bank-protection strips to reduce run-off entering the river system. It also recommends the treatment of domestic and industrial sewage and waste-water. Such measures must be

implemented, and their efficacy monitored if an ecological disaster (such as is happening in the lower Awash river) is to be avoided.

Further reading

Duckworth (1974a, b), Ethiopian Valleys Development Authority (1988, 1990), Urban (1967).

Lake Zeway

Admin region Oromiya

Coordinates 07°59'N 38°49'E

Area 65,400 ha Altitude 1,636 m

ET041

A4iii

Unprotected

Site description

Lake Zeway is a slightly alkaline lake in the central section of the Ethiopian Great Rift Valley. It lies to the east of Zeway town, c.115 km south-west of the East Shewa Zone capital, Nazaret. It is within a broad, down-faulted basin that to the south, and within the same drainage, includes Lakes Abijatta, Langano and Shalla. Also to the south, the landscape is dominated by Mt Aleltu (c.1,880 m). Within 10 km to the east and west of the lake are higher faulted ridges. To the north, the land rises gently to 1,670 m where it meets the watershed of the Awash river and Koka dam reservoir. The lake is c.29 km long and 20 km wide, with a maximum depth of 8 m (mean c.2.5 m), and a seasonal variance of 0.5–1.2 m. There are several islands, some inhabited, the largest probably for 1,000 years and supporting an Orthodox Christian community. The Lake Zeway catchment is 7,025 km², fed by a number of rivers, of which the Meki and Catar are most significant. The Meki drains the Gurage mountains to the west and north-west of the lake, and the Catar rises in the Arsi highlands to the east. Lake Zeway drains into Lake Abijatta via the Bulbula river. Lake Zeway is for the most part bordered by swamp: discontinuous blocks of *Typha* spp. and *Cyperus papyrus* fringe the shoreline, the latter being used to build boats similar to those found in Lake Tana. However, much of the shoreline and open water has now been invaded by *Eicchornia crassipes*. Narrow thickets of *Aeschynomene elaphroxylon* (which provides a light balsa wood used to build boats) are found in areas subject to flooding and along the banks of the Bulbula river. Immediately inland, and especially along the western shoreline, there are expanses of *Cynodon plectstachyus* and the endemic *C. aethiopicus* which provide valuable grazing when the lake is low. However, where there is alkaline seepage, vegetation cover may be sparse and largely confined to low tussocks of the unpalatable grass *Sporobolus spicatus*. Most of the area around Lake Zeway used to be covered in *Acacia* woodland, although much of this has now been cleared for farmland, especially large-scale irrigated fields producing export crops and cut flowers. Lake Zeway has a thriving, traditional fishing industry utilizing small boats, nets and lines. The main market for the catch is Addis Ababa.

Birds

See Box for key species. Lake Zeway may support over 20,000 waterbirds on a seasonal basis. The most common species are *Pelecanus onocrotalus*, *Leptoptilos crumeniferus* (which roosts in large numbers by the lake, adjacent to town), *Dendrocygna bicolor*, *D. viduata*, *Larus ridibundus*, *L. cirrocephalus*, *Chlidonias hybridus* and *C. leucopterus*. There is also a mixed roost of several thousand *Phalacrocorax carbo* and *P. africanus* close to the fisheries jetty. Other interesting species include *Thalassornis leuconotus*, *Nettapus auritus* and *Gallinula angulata* (in small numbers), *Sterna caspia* and *S. sandvicensis* (isolated records only) and *Phalaropus lobatus*. Large numbers of *Hirundo rustica* and *Motacilla flava* have been seen close by and may roost at the site.

Key species

A4iii	The site is thought to hold a minimum of 20,000 waterbirds on a seasonal basis.
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Other threatened/endemic wildlife

Eight species of fish are known, one of which, a barbel *Barbus zwaicus*, is probably endemic.

Conservation issues

The town of Zeway is expanding rapidly as it develops into a major transport and marketing centre. All the water for the town comes from

the lake. The expansion of irrigated, intensive agriculture (producing fruit, vegetables and cut flowers) has introduced chemical fertilizers and pesticides into the ecosystem, and a decline in waterbirds and large fish has been noted in recent years. The recent invasion of *Eichornia crassipes* is undoubtedly having an adverse effect on the breeding grounds of the fish. Increasing demands are being made on the water and other natural resources of Lake Zeway: *Typha* spp. and *Cyperus papyrus* are cut (and sold) for thatching houses; birds are caught to sell, and tourists shoot some for sport. Increasing numbers of people use the lake for recreational purposes causing disturbance to feeding and roosting birds. Goats were recently introduced to Gelila and Debre Sina islands, seriously affecting the native trees and grasses.

Further reading

Hughes and Hughes (1992), Makin *et al.* (1976), Syvertsen (1995a), Tefera (undated).

Gambella National Park	ET042
Admin region Gambella	
Coordinates 07°52'N 34°00'E	A1, A3 (A04)
Area 506,100 ha Altitude 500 m	Proposed National Park

Site description

Gambella National Park is in the centre of Gambella Region. It lies between the Baro and Gilo rivers, the Baro river forming the northern boundary, c.15 km south of Gambella town. The centre of the park, Abobo, is 82 km south of Gambella town. The park is the largest protected area in Ethiopia. The general topography is flat with some areas of higher ground where deciduous woodland and savanna occur. The higher areas are often rocky with large termite mounds. The park also supports extensive areas of wet grassland and swamps with grasses growing over 3 m tall. Other important habitats include the rivers, their banks and the oxbow lakes. Traditionally, the Nilotic peoples who live in the area graze their animals throughout the park, grow a few crops on the riverbanks and hunt for game-meat. Presently many refugees from southern Sudan have moved into the park, and some of the settlements set up for the highland people brought to the Gambella plains after the 1984–1985 drought and famine have remained populated.

Birds

See Box and Table 3 for key species. More than 230 species have been recorded in the park. *Balaeniceps rex* was recorded in the early 1960s, 20 km west of Gambella. There are recent anecdotal reports of the species breeding in the Abobo area, suggesting that it may be present seasonally in swamps within the park. *Acrocephalus griseldis* was recorded regularly between 1969 and 1976, but its current status is unknown. Sudan–Guinea Savanna biome species include: *Merops bulocki*, *Eremomela pusilla*, *Cisticola ruficeps*, *C. troglodytes*, *Plocepasser superciliosus*, *Lagonosticta larvata* and *Vidua interjecta*, the last-named being known in Ethiopia only from around Gambella. Three Afrotropical Highlands and four Somali–Masai biome species have been recorded. Other species include *Platalea leucorodia* (rarely recorded from the south and west of Ethiopia), *Kaupifalco monogrammicus* (little-known in Ethiopia), *Campethera cailliautii* and *Acrocephalus melanopogon*. The only Ethiopian record of *Vanellus crassirostris* is from Gambella.

Key species

A1 *Balaeniceps rex* *Acrocephalus griseldis*
 A3 (A04) Sudan–Guinea Savanna biome species: 11 of the 16 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

This park was proposed to help protect the diverse and abundant wildlife, particularly the thousands of *Kobus kob* that migrated to and from the park each year. Even though proposals to set up this conservation area have been planned since 1973, there has been almost no development activity. The area proposed is very large and the available infrastructure is completely inadequate to manage it

effectively. Excessive hunting seriously affects the larger mammals in the area. The civil war in Sudan has made firearms readily available, and large numbers of refugees have moved into the park. Local people traditionally use bush-meat, and formerly hunted only with spears, traps, etc. Now both the local and commercial hunters use rifles and automatic weapons. The woodlands and forests within the park are being cut, with the wood sold in Gambella town for construction and fuel. Visitors have reported a noticeable reduction in the woody vegetation both inside and outside the park. The park is frequently burnt: the fires are started when the ground is still moist to control the long grass and thus open up access to the new growth for cattle to graze. The biggest threat to the park is the Alwero dam and the proposed expansion of irrigated farms to areas currently inside the park.

Further reading

Duckworth (1974a, b), Hillman (1993), Urban (1967).

Shek Husein	ET043
Admin region Oromiya	
Coordinates 07°50'N 40°35'E	A1
Area Undefined Altitude c.1,200 m	Unprotected

Site description

Shek Husein is about 80 km north of Ginir. It is in a limestone gorge, but this is broader than that at Sof Omar (site ET052). The river running through the valley (a tributary of the Wabi Shebelle) is characterized by large boulders and pools. The vegetation comprises mixed *Acacia* and deciduous woodland, but overall the site is less heavily wooded than at Sof Omar. The area has been little visited by ornithologists in recent years because of security problems. However, it is one of the most important Muslim shrines in the country and twice a year thousands of pilgrims make their way to the old settlement.

Birds

See Box for key species. This is an important site for *Serinus xantholaema*, most recently seen in 1990. The Somali–Masai biome species *Cisticola bodessa* is among the other birds recorded in the area.

Key species

A1 *Serinus xantholaema*

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Unknown.

Further reading

Ash and Gullick (1989).

Mugo highlands	ET044
Admin region Southern Peoples' Region	
Coordinates 07°45'N 37°48'E	A1, A2 (115), A3 (A07)
Area Undefined Altitude 2,400–3,100 m	Unprotected

Site description

The Mugo highlands are 35 km north of Hosana town in Gurage Zone. The zonal capital is Wolkite. The highland area runs north–south, forming part of the western edge to the Great Rift Valley, and the watershed between the Great Rift Valley Lakes region to the east and the Omo river basin to the west. The highlands are characterized by steep slopes and deep gorges (200–400 m deep, cut by streams and rivers) rising from 2,400 m to a relatively level top which peaks at 3,100 m. A recent survey visited a deep valley that contained degraded montane woodland with shrubs of *Erica arborea* and *Rosa abyssinica* and a few trees including *Hagenia abyssinica*, *Juniperus procera*, *Schefflera abyssinica*, *Croton macrostachyus* and *Ekebergia capensis*. Occasional isolated large *Podocarpus falcatus* trees indicate that the area was previously covered with mixed montane forest. The most widely planted exotic throughout the area is currently *Eucalyptus globulus*. Areas outside the steep valley were covered in grasses and

other herbs grazed to a short turf, or had been converted to fields for crops.

■ Birds

See Box and Tables 2 and 3 for key species. This site supports a substantial number of Afrotropical Highlands biome species, including *Macronyx flavicollis* and *Myrmecocichla melaena*, both of which are uncommon. Four Ethiopian endemics have been recorded, namely *Dendropicos abyssinicus*, *Macronyx flavicollis*, *Parophasma galinieri* and *Serinus nigriceps*.

Key species

A1	<i>Macronyx flavicollis</i>
A2 (115)	Central Ethiopian highlands EBA: One of the four species of this EBA has been recorded at this site; see Table 2.
A3 (A07)	Afrotropical Highlands biome species: 28 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The forest areas within the deep valleys (such as the one described above) have been protected by their relative inaccessibility. However, these areas are close to human settlements where few plants remain. The whole area is seriously threatened by conversion to agriculture, deforestation, overgrazing and resultant excessive soil erosion. The human population is increasing rapidly, and the total conversion of the site into agricultural land is a real possibility. Hosana is an important regional town, with a large high school and many primary and secondary schools. There is also a special school for the deaf and another for training medical auxiliaries. An effective environmental education programme could help create local awareness of the importance of forest and woodland remnants, and of the animals associated with them.

■ Further reading

Sutcliffe *et al.* (1988).

Koffe swamp

Admin region Oromiya

Coordinates 07°45'N 36°30'E

Area Undefined Altitude 1,650–1,670 m

ET045

A1

Unprotected

■ Site description

Koffe swamp is 7 km south-west of Jimma, the capital of Jimma Zone. It is on the Jimma–Seka road in an area of relatively flat land, surrounded by small hills. Small rivers in the area include the Kilo and Melka Faki. Koffe swamp supports significant expanses of *Typha* sp., but there is no further information on vegetation. However, at Jimma Airport, the swamp near the road also comprises *Persicaria* spp. and *Alisma plantago-aquatica*, while the meadow around the airport has several species of grasses up to 1 m tall. Areas of short grassland, which are intensively grazed, contain *Cynodon dactylon* and some clumps of *Hyparrhenia* sp. The dominant crop is maize, but the farmers also grow root and other crops.

■ Birds

See Box for key species. Koffe swamp is believed to be a breeding location for *Grus carunculatus*, with at least 10 present in December 1995. According to local inhabitants, the species breeds in the wetlands of the Koffe Peasants' Association, with birds also seen on the nearby Jimma Airport wetland. *Macronyx flavicollis* also occurs (at least 10 birds), as do small numbers of various Palearctic and Afrotropical ducks and geese. In all, 78 species have been recorded at the site. *Sarothrura rufa* is also known to occur in Koffe swamp, and various Palearctic crane species may use the site seasonally.

Key species

A1	<i>Grus carunculatus</i>	<i>Macronyx flavicollis</i>
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■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Koffe swamp is totally unprotected, although it is part of an area controlled by the Koffe Peasants' Association. A disturbing report was that the eggs of *Grus carunculatus* are being collected and sold. The farmers view these birds as pests because they voraciously eat *Eragrostis tef*, particularly when it is about to mature. There is a small-scale industry in the area making red-clay bricks from soil dug out of the swamp area. The area under crops is expanding at the expense of the few remaining patches of natural forest and woodland.

■ Further reading

Ethiopian Wildlife and Natural History Society Survey Team (1995).

Metu–Gore–Tepi forests

Admin region Oromiya

Coordinates 07°42'N 35°15'E

Area Undefined Altitude 500–2,600 m Natural Forest Priority Areas

ET046

A1, A3 (A07)

■ Site description

Metu–Gore–Tepi is a general name used for the forests found along the western edge of the plateau between Metu and Tepi in Illubabor Zone. Metu is the zonal capital. The area includes the following National Forest Priority Areas: Syllem–Wangas, Sheko, Yeki and Godere. Between Metu and Tepi, the western edge of the plateau drops from 2,600 m in a series of escarpments down to 1,000 m at the edge of the Gambella plains. Most of the area is formed of black basalt. The Baro and Gilo rivers have their headwaters in these forests and have cut deep valleys through the escarpment. The main habitats along the escarpment are forest, grassland, wetland and cultivated areas. There are two types of wet forest on the western escarpment: transitional forest at 500–1,500 m and Afromontane forest at 1,500–2,600 m. The transitional forest is a humid, broadleaf forest, rich in tree species (at least 90). A number of these trees are found in Ethiopia only in this forest-type, the most important of these being *Aningeria altissima*. In the Afromontane forest, *Aningeria adolfi-friederici* is the largest and most important timber species, with some *Podocarpus falcatus* found at the higher altitudes. Floristically this is the richest forest-type in Ethiopia, with over 100 tree species and a diverse understorey. Forest cover is not continuous and, particularly on the flatter areas, there are extensive areas of grassland. Various *Acacia* spp. dominate the forest–grassland ecotone. Basalt forms an impervious edge to several of the valleys resulting in swamps and lakes (e.g. Lake Bishanwaha) which add considerably to the area's biodiversity. Several aquatic plant species are found only in these wetlands. The biggest employers in the area are the coffee and tea estates. However, most of the area is occupied by peasant farmers who cultivate maize and root crops, keep bees, and collect and/or cultivate forest species, particularly coffee and the endemic spice *Aframomum corrorima*.

■ Birds

See Box and Table 3 for key species. Due to their isolation, the forests of south-west Ethiopia are relatively depauperate in terms of their avifauna. However, small populations of *Rougetius rougetii* and *Macronyx flavicollis* occur, along with many other Afrotropical Highlands biome species. Two Ethiopian endemics, *Poicephalus flavifrons* and *Dendropicos abyssinicus* have been recorded. Species otherwise rarely recorded in Ethiopia include *Podica senegalensis* (at Lake Bishanwaha), *Cossypha niveicapilla*, *Nectarinia chloropygia* and *Euplectes gierowii*.

Key species

A1	<i>Rougetius rougetii</i>	<i>Macronyx flavicollis</i>
A3 (A07)	Afrotropical Highlands biome: 26 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The greatest threat to these forests is the development of estates growing cash-crops. Forest near Gore has been cleared and replaced by tea plantations, and near Tepi the coffee estates started in the 1970s are expanding. There is now a proposal to clear another area of primary forest near Tepi for a rubber estate. In the 1980s, local villages

expanded with settlers from northern Ethiopia. This not only increased the population, but also introduced new skills and attitudes such as the increased use of timber for making household items to sell in the expanding urban centres. There are at least five sawmills in the region and the forests are being logged without any management plan having been made. Increased access to a cash economy has also affected the traditional use of the wetlands. In the past, the areas around the lakes and swamps were cultivated only as the water dropped naturally through the dry season. However, valleys are now being drained so that vegetable crops can be grown more continuously and over a wider area in order to supply the markets in Metu and Jimma.

Further reading

Friis (1992), Osborne (1981), Russ and Wolde (1979).

Lake Langano

Admin region Oromiya

Coordinates 07°37'N 38°46'E

Area 65,400 ha Altitude 1,580 m

ET047

A1

Unprotected

Site description

Lake Langano is in East Shewa Zone. It is one of a group of lakes in the middle of the Ethiopian Great Rift Valley, about 55 km south of Zeway. The main source of water, via several small rivers, is from the Arsi mountains (which form the eastern wall of the Great Rift Valley). Water flows from the lake via the Horo Kelo river into nearby Lake Abijatta (within Abijatta–Shalla Lakes National Park, site ET048). The lake is 23 km long, has a maximum width of 16 km, and is up to 46 m deep. There are two islands, one with hot springs, and both visited regularly by people. The lake is alkaline. Seasonal variation in the water-level is less than 1 m. Much of the shore comprises rocky or pebble beaches (devoid of vegetation), particularly on the eastern side, with a number of swampy bays in the north and south. The sandy beaches frequented by visitors are mostly on the western shore. Sedges and rushes fringe some parts of the lake and cover many of the small swampy bays. *Ceratophyllum demersum* and *Potamogeton* spp. are important submerged aquatics. The area between Lakes Langano and Abijatta is naturally open *Acacia* woodland and bush, but many of the trees have been cut and much of the land cleared for cultivation. The eastern side of the lake, where the streams enter, retains some trees, especially *Ficus* sp. and small *Sesbania* sp. On the southern and south-eastern shores there are dense thickets of *Acacia*, other spiny bushes, climbers and large *Ficus vasta* and *F. sycamoros* trees. The surrounding slopes, within Munessa State Forest, are dominated by *Podocarpus falcatus*. The lake is much used for recreational activities.

Birds

See Box for key species. *Falco naumanni* and *Circus macrourus* overwinter in small numbers, with others occurring on spring and autumn passage. *Phoenicopterus minor* numbers fluctuate unpredictably. Large numbers of waterfowl use the lake, including *Pelecanus onocrotalus* (regularly 150–200 birds) and *Phalacrocorax carbo* (small numbers breed on the islands). A number of waders, terns and gulls also frequent the lake. An apparently undescribed *Hirundo* sp. has been recorded from the cliffs at the southern end of the lake, from where there have also been records of an unidentified *Serinus* sp. Huge numbers of *Motacilla flava* and *Hirundo rustica* pass along the western side of the lake, as do a number of migratory raptors. Other species present around the lake (and in the Munessa State Forest) include a substantial number of the Somali–Masai and Afrotropical Highlands biome species. *Aquila verreauxii*, *Caprimulgus tristigma* and *Pytilia phoenicoptera* have also been recorded.

Key species

A1 *Falco naumanni*
Circus macrourus

Phoenicopterus minor

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Loss of soil through wind erosion is an increasing problem (preventing regeneration or rehabilitation) as the vegetation around the lake is

removed or degraded. This is especially the case between Lakes Langano and Abijatta. Another threat is the development of geothermal power, to the north of the lake, that has the potential to introduce super-hot water into the lake system. Tourism, although not currently a problem, is growing and may have an increasing impact if not managed with environmental considerations in mind. A local organization, FARM Africa, has started a community-based ecotourism project on the eastern shore of the lake, including a tented camp with solar-powered lighting and cooking.

Further reading

Ethiopian Tourism Commission (undated a), Hughes and Hughes (1992), Madge and Redman (1989), Talling and Wood (1988), Urban (1970), Vittery (1983).

Abijatta–Shalla Lakes National Park

ET048

Admin region Oromiya

Coordinates 07°30'N 38°30'E

A1, A3 (A08), A4i, A4iii

Area 88,700 ha Altitude 1,500–1,700 m Proposed National Park

Site description

The National Park is a combination of Lakes Abijatta and Shalla, and the land between and around them, in East Shewa Zone. The park is 56 km south-west of Lake Ziway and to the west of the main Mojo–Moyale road. Both lakes are without outlets, and the water is alkaline. Lake Abijatta is very shallow (up to 14 m), while Lake Shalla, in the crater of an extinct volcano, is very deep (up to 266 m). Three rivers, the Gogessa, Bulbula and Hora Kelo, feed Lake Abijatta. The lake had an area of 19,600 ha, a shoreline of 60 km and was full of fish, but by 1995, it had shrunk dramatically and no fish-eating birds were seen. Water is being removed from the lake to feed a soda-ash extraction plant, and from the Bulbula river for irrigation. Fish and aquatic plants now regularly occur only around the mouth of the Bulbula and Hora Kelo rivers. The shoreline is gently sloping. The nearby *Acacia* woodland used to have a more or less continuous (25-m-high) canopy, but most of the trees have been felled and turned into charcoal or sold as fuelwood. Lake Shalla is south of Lake Abijatta and divided from it by a narrow strip of higher land, part of the old crater rim. Two rivers feed the lake. It has an area of c.33,000 ha and a shoreline of 118 km. It has several hot, somewhat sulphurous springs around the shore, and nine islands of which at least four are important breeding sites for birds. Bulrushes grow where the hot springs and rivers enter the lake, but most of the shore comprises steep cliffs, thus there is little place for wading birds and there are no fish. The vegetation to the east and south of the lake is *Acacia–Euphorbia* savanna, the most common trees being the woodland *Acacia* spp. (*A. etbaica* and *A. tortilis*) and *Euphorbia abyssinica*, and bushes of *Maytenus senegalensis*. The woodland around the lakes is important in keeping the highly fragile soil structure intact. In undisturbed/ungrazed areas there is a rich grass and herb flora.

Birds

See Box and Table 3 for key species. Over 400 species have been recorded from the park. The park is at one of the narrowest parts of the Great Rift Valley, a major flyway for both Palearctic and African migrants, particularly raptors, flamingos and other waterbirds. Among the globally threatened species known from the park are: *Aquila heliaca* (a rare passage migrant); *Falco naumanni* (an uncommon passage migrant with a few wintering); *Circus macrourus* (fairly common passage migrant, with a few wintering); and *Acrocephalus griseldis* (status unknown). *Glareola nordmanni* has also been recorded. Fish-eating birds have mostly abandoned the park since the fish in Lake Abijatta died out. However, huge numbers of many wetland species remain, such as *Phoenicopterus ruber*, *P. minor* (the numbers of which fluctuate), *Anas clypeata* and *Charadrius pecuarius*. The fringes of Lake Abijatta form an important feeding and resting ground for waders and ducks, particularly *Anas clypeata*, *Recurvirostra avosetta*, *Calidris minuta* and *Philomachus pugnax*. Smaller insectivores, such as *Motacilla flava* and *Hirundo rustica*, have also been recorded in massive numbers. The islands of Lake Shalla used to be important breeding sites for cormorants, storks and pelicans, and colonies of *Phalacrocorax carbo* and small numbers of *Pelecanus onocrotalus* still occur. One endemic, *Poicephalus flavifrons*, and five Afrotropical Highlands biome species have also been recorded. Among the unusual visitors to Lake Abijatta are *Calidris alpina*, *C.*

melanotos, *Charadrius mongolus*, *C. alexandrinus*, *Pluvialis fulva*, *P. squatorola*, *Phalaropus lobatus*, *Glareola nordmanni*, *Grus carunculatus* (five in 1991–1992), *Netta erythrophthalma*, *Larus ichthyaetus* and *L. cachinnans*.

Key species			
A1	<i>Phoenicopterus minor</i>	<i>Grus carunculatus</i>	
	<i>Circus macrourus</i>		
A3 (A08)	Somali–Masai biome species: 20 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.		
A4i		Breeding (pairs)	Non-breeding
	<i>Podiceps nigricollis</i>	—	up to 700
	<i>Phoenicopterus ruber</i>	—	59,000
	<i>Phoenicopterus minor</i>	—	100,000–230,000
	<i>Anas clypeata</i>	—	43,736
	<i>Himantopus himantopus</i>	—	4,000
	<i>Recurvirostra avosetta</i>	—	12,000–17,200
	<i>Charadrius pecuarius</i>	—	10,968
	<i>Calidris minuta</i>	—	36,272
	<i>Philomachus pugnax</i>	—	35,819
	<i>Sterna nilotica</i>	—	650
	<i>Chlidonias leucopterus</i>	—	2,500
A4iii	The site holds more than 20,000 waterbirds on a regular basis.		

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The National Park was proposed because of the diverse avifauna, in particular waterbirds, and the scenic beauty of the area. During the 1980s, the park developed well. Staff were properly housed, much of the area was well controlled, and well visited (being adjacent to a major recreation resort, Lake Langano). However, this was all without the support of the local people, and during the early 1990s the park went into decline. By the end of 1996, the rehabilitation of the park was under way and there are plans for active integration of local communities in its future planning and development. Despite the unsuitability of the soils for agriculture and grazing, local people use the area for both of these activities. Additionally, much of the *Acacia* woodland surrounding Abijatta has been cut down for charcoal. People from the urban centres north and south of the area (many probably unemployed) used to come and fish illegally in Lake Abijatta. Currently, small groups come and remove the *Acacia* trees and are even removing the salty soil from the shoreline to sell. However, the soda-ash extraction plant on the north-eastern side of Lake Abijatta probably has the greatest impact on the area. Since the plant was set up, the lake area has diminished and many fish have died. The effect of climate change is unclear, although geological records from the area show that there have been great historical fluctuations in lake-levels. Abijatta–Shalla used to support one of the largest African colonies of *Pelecanus onocrotalus*: the birds bred on an island in Lake Shalla and fed their chicks on fish caught in Lake Abijatta. The pelicans along with other fish-eating birds deserted the area due to the declining fish stocks in the lake. This situation appears to be reversible: in December 1996 the lake-level rose (due to heavy rains), and there were reports of fish in the lake as well as a group of pelicans apparently fishing. Key development requirements are: an integrated water-management and monitoring programme; direction of revenue from the growing tourist industry to the wildlife authority; integration of local people in the development of the park; and control of the use of and access to the woodlands.

Further reading

Hillman (1988, 1993), Shibru Tedla (1995), Stephenson (1978), Syvertsen (1995a), Urban (1984), Zerihun Woldu and Mesfin Tadesse (1990).

Boyo wetland		ET049
Admin region	Southern Peoples' Region	
Coordinates	07°29'N 38°03'E	A1, A4iii
Area	Undefined	Controlled Hunting Area
Altitude	1,880 m	

Site description

Boyo Wetland is 26 km north of Alaba Kulito, Hadiya Zone. It is in the Bilate river basin that drains from the Gurage highlands south

into Lake Abaya. The two main tributaries of the Bilate river, the Guder (which originates in the mountains near the zonal capital Hosana) and the Weira, merge at Boyo wetland. The vegetation of this wetland has not been studied. The site is within one of the most intensely cultivated areas in the country. It is self-supporting in food crops and many other items, and produces much for Addis Ababa.

Birds

See Box for key species. Small numbers of *Falco naumanni* appear to pass through the site on spring and autumn passage and a few may overwinter. *Circus macrourus* is fairly common on spring and autumn passage, with small numbers overwintering. Boyo wetland supports a high concentration of waterbirds. During a one-day survey in April 1996, 62 *Grus carunculatus* and three *Balearica pavonina* were recorded. During the same survey, other waterbird counts included *Ardeola ralloides* (40+), *Bubulcus ibis* (3,000+), *Mesophoyx intermedia* (300+), *Mycteria ibis* (80+), *Plegadis falcinellus* (1,200+), *Threskiornis aethiopicus* (150+), *Plectropterus gambensis* (75+) and several thousand Palearctic waders of various species. Counts covered a maximum of 10% of the total area, and the total number of waterbirds was thus estimated to exceed 20,000.

Key species		
A1	<i>Grus carunculatus</i>	<i>Circus macrourus</i>
A4iii	The site is known to hold a minimum of 20,000 waterbirds, on a seasonal basis.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The Boyo wetland is listed as a Controlled Hunting Area for *Hippopotamus amphibius*. The area around the wetland, especially the western side, is being used as range- and farmland, and the hills are denuded of trees and grass cover. As a consequence, the land is severely eroded and the lake is silting up. Other threats include human settlement and the introduction of exotic tree species. Silt deposits have attracted people to expand cultivation in the area, and farmers are planting *Eucalyptus globulus*, an exotic tree species well known for drying out soils. Birds face disturbance from people and domestic stock.

Further reading

National Water Resources Commission (1987).

Bonga forest		ET050
Admin region	Southern Peoples' Region	
Coordinates	07°17'N 36°15'E	
Area	161,423 ha	A3 (A07)
Altitude	1,000–3,400 m	National Forest Priority Area

Site description

Bonga forest is in Keficho-Shekicho Zone, south-west Ethiopia. The zonal capital, Bonga, is c.100 km south-west of Jimma. Bonga forest cloaks the highland area to the east of the Dincha river. The area comprises ridges and valleys through which the Guma, Sheko, Bitno and Ihina rivers and several small streams drain into the Dincha. Habitats include rivers and streams with riverine forest, upland montane forest and an *Erica arborea* zone above 3,000 m. The main forested area is broadleaf (Afro-montane) forest, which lies between 1,500 and 2,500 m and has many large tree species forming a canopy 10–30 m high. The tallest trees are *Aningeria adolfi-friderici*. Other canopy species include *Ocotea kenyensis*, *Olea capensis*, *Sapium ellipticum*, *Macaranga capensis*, several species of *Albizia*, *Euphorbia ampliphylla*, *Polyscias fulva*, *Schefflera abyssinica* and several different *Ficus* spp. There is a rich understorey that includes the tree-fern *Cyathea manniana* found in moist ravines and near waterfalls, *Dracaena steudneri* and *Coffea arabica*. The higher parts of the forest support smaller trees such as *Hagenia abyssinica* and *Prunus africana*. Bonga forest has long been exploited for its large timber species and this is continuing. Some areas have been left to regenerate naturally, but over 2,000 ha have been planted with exotic and native species such as *Eucalyptus*, *Hagenia abyssinica*, *Cordia africana*, *Cupressus*, *Grevillea* and *Pinus patula*.

Local people make extensive use of the forest and many non-timber forest products are collected, particularly coffee and honey.

■ Birds

See Box and Table 3 for key species. The forest avifauna in south-west Ethiopia is less diverse than in the country's bushland habitats. During surveys in December 1995, 100 species were recorded at this site. Afrotropical Highlands biome species include *Lybius undatus* and good numbers of *Poeyoptera stuhlmanni*. Other interesting forest species present are *Apaloderma narina* and *Coracina caesia*. *Cisticola troglodytes* has also been recorded from the area.

Key species

A3 (A07) Afrotropical Highlands biome species: 15 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

Although there are no endemic tree species in these forests, undergrowth and epiphyte diversity is high and includes endemics such as cardamom *Aframomum corrorima*.

■ Conservation issues

High-altitude forest is severely threatened in Ethiopia. Although Bonga forest is designated a National Forest Priority Area, little has been done to enforce the existing legislation. The current forest extent is unknown, but it has decreased since the 1970s. The forest is next to two major roads, making the removal of timber relatively easy. The more accessible parts of the forest are highly disturbed and now comprise thick undercover that could certainly be a hindrance to the larger mammals reported to occur. The fact that any forest remains is almost certainly due to the broken terrain within the Dincha watershed. Major threats include the introduction of exotic tree plantations, clearance for agriculture, and some grazing. The effect of grazing is currently not serious, but could become so, severely affecting the potential for forest regeneration. The forest coffee, *Coffea arabica*, of Bonga is genetically important, as it was from this area, near Wushwush, that the first plants with natural resistance to coffee berry disease were identified. Tree-ferns *Cyathea manniana* are known from only a few locations in Ethiopia; they require well-shaded and moist conditions to grow and would disappear if the forest were destroyed.

■ Further reading

Brown and Urban (1970), Chaffey (1979), Friis (1992).

Senkele Sanctuary

Admin region Oromiya

Coordinates 07°12'N 38°17'E

Area 3,640 ha Altitude 2,020–2,120 m

ET051

A1

Wildlife Sanctuary

■ Site description

Senkele Sanctuary is in East Shoa Zone, 53 km south of Shashemene, and c.300 km south of Addis Ababa. The vegetation in the sanctuary is best described as montane savanna, and comprises various different habitat associations such as savanna woodland, natural grassland (with fewer trees and shrubs) and, in the valleys, rich shrubland. In the surrounding area, livestock and crop production are the major sources of income. The Sanctuary is the only available grazing land in the Zone, and over 10,000 cattle depend on the area during the rainy season. The resultant reduction in space and the poor quality of grazing land have forced the livestock and native mammals to compete. It has also compromised the integrity of feeding and breeding habitats for many bird species. Since the early 1990s, a large portion of the Sanctuary has been cultivated under maize *Zea mays* and beans *Phaseolus vulgaris*, which has severely reduced the amount of land available to wildlife.

■ Birds

See Box for key species. Among the 191 bird species recorded from the sanctuary are nine Afrotropical Highlands biome species, four Somali–Masai biome species, and two globally threatened species, of which one is *Aquila clanga*. Birds of particular note include *Mycteria ibis*, *Bostrychia carunculata*, *Gyps africanus*, *Circaetus gallicus*, *Terathopius ecaudatus*, *Melierax metabates*, *Buteo rufinus*, *Aquila*

pomarina, *Accipiter castanilius* (representing probably the first Ethiopian record), *Numida meleagris*, *Ardeotis kori* and *Eupodotis melanogaster* (common).

Key species

A1 *Circus macrourus*

■ Other threatened/endemic wildlife

None known. However, the Senkele Sanctuary was established to conserve the threatened endemic subspecies *Alcephalus buselaphus swaynei* (EN), which is present along with populations of at least 37 other mammal species.

■ Conservation issues

During the 1990s, the area came under increasing human pressure, significantly impacting the habitat available to the native wildlife. Many new settlements (over 1,400 huts) have been established in and immediately around the Sanctuary. Although efforts have been made to prevent habitat loss, a lack of law enforcement, the volatile political conditions and a lack of alternatives available to the local people have resulted in continuing encroachment and habitat conversion. Local people cut shrubs and trees (e.g. *Acacia* spp., *Terminalia glaucescens*, *Albizia schimperiana*) for house construction and firewood. In July 1999, over 100 women (each with a donkey) were seen collecting firewood from inside the Sanctuary, an activity that apparently occurs on two days each week. The dominant grass species, *Pennisetum schimperi*, is harvested for use in house construction. The protected status of this Sanctuary urgently needs upgrading within the government system. Recommendations have been made to establish a more effective, multiple-use system of wildlife conservation and human land-use. Zoning within the Sanctuary has been proposed as follows: a wildlife zone reserved for the exclusive use of the wildlife, and within which there is no human utilization of the resources; a grazing zone where limited grazing would be allowed during the wet season; a sylvi-pastoral zone for limited grazing and limited utilization of the woody vegetation; and a buffer zone between the Sanctuary and the surrounding crop land.

■ Further reading

Harries (1989), Hillman (1993), Lewis and Wilson (1977, 1979), Messana and Bereket (1994).

Sof Omar

Admin region Oromiya

Coordinates 06°54'N 40°47'E

Area Undefined Altitude 1,150–1,450 m

ET052

A1, A3 (A08)

Unprotected

■ Site description

Sof Omar is in the middle of Bale Zone, 120 km east of zonal capital Goba. With over 15 km of passages, Sof Omar is Ethiopia's longest cave system. The Weyb river flows from its source in the Bale mountains, through the caves, finally joining the Genale river at Dolo on the border with Somalia. Before entering the caves, the river passes through a valley cut into the limestone. The sides of the valley, which comprise large fossil-rich limestone blocks, are covered with a wide variety of small trees, bushes and climbers. The more level areas and border of the river are covered in fine black soil that supports some larger *Acacia* and fig trees. The vegetation-type is described as *Commiphora–Kirkia–Acacia* woodland and bushland. Many species, such as the shrubs *Commiphora monoica* and *Euphorbia baleënsis*, and a crustacean are only known from this area (some also occurring at Shek Husein, site ET043). There are almost certainly as-yet-undescribed species in this isolated limestone area. The caves and the entrance area are a shrine named after the Muslim saint Shek Sof Omar. The shrine is well-visited by pilgrims, and is becoming increasingly popular with tourists. Many of the trees in the area, although small, produce hardwood prized for making charcoal, or coloured woods that are carved into household items. There is some cultivation, particularly in the higher-rainfall areas towards Ginir.

■ Birds

See Box and Table 3 for key species. Sof Omar is an important site for *Serinus xantholaema*. The narrow limestone gorge adjacent to the

cave entrance is where most recent records of this rare species originate. Records (between 1989 and 1996) of up to eight birds both from within the gorge and up to 8 km west of the bottom of the gorge suggest that the population is stable. Other species include the biome-restricted *Spreo fischeri* and *Onychognathus salvadori* (the first breeding record of which came from this site), and the uncommon *Cercomela scotocerca*.

Key species

- A1 *Serinus xantholaema*
 A3 (A08) Somali–Masai biome species: 17 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Muslim pilgrims have been coming to Sof Omar for many centuries and the paths down to and around the cave entrance are well worn. However, the pilgrims and the local people share a common lifestyle that has not made excessive demands on the local resources. With increasing numbers of tourists this status quo is changing. Apart from camping, there is no provision for tourists to stay in the valley. Should a hotel or similar facility be planned for the area it will need to be carefully sited to avoid interfering with the habitats of the rare birds and plants found in the area.

Further reading

Ash and Gullick (1989), Catlin *et al.* (1973), Robertson (1994), Robson (1977), Smith and Smith (1996).

Lake Awassa

Admin region Southern Peoples' Region
 Coordinates 07°03'N 38°25'E
 Area 12,900 ha Altitude 1,700 m

ET053

A4i, A4iii
 Unprotected

Site description

Lake Awassa lies to the west of Awassa town, the capital of the Southern Peoples' Region, and c.275 km south of Addis Ababa. The Awassa basin is in an old caldera in the middle of the Ethiopian Rift Valley, between the Abijata–Shalla basin to the north and that of Lakes Abaya and Chamo to the south. The walls of the caldera form steep walls to the north and east of the basin while most of the flatter areas are intensively cultivated. Lake Awassa is in the lowest portion of the caldera, along with a previously extensive wetland, Lake Shallo and the Shallo swamp. The swamp drains into Lake Awassa through a small river called Tiqu Wuha, which means 'black water'. There are no outlets from the lake, but water may seep away through the underlying volcanic ash and pumice. Awassa is a freshwater lake, even though the system appears to be closed. The level of the lake varies considerably from year to year and a dyke has been built to prevent the town from flooding. The surface area ranges between 8,500 and 9,000 ha and the maximum depth is c.18–22 m. The shoreline varies between 50 and 65 km in length. Awassa is the smallest of the Rift Valley lakes, but is highly productive. It has a rich phytoplankton (over 100 species have been identified) and zooplankton that support large populations of six fish species. The most important commercial species is *Oreochromis niloticus*, but there are also good populations of catfish and *Barbus*. The shoreline is gently sloping and mostly covered with vegetation that can extend 50 m or more into the lake. There are extensive beds of Cyperaceae and *Typha* spp. The dominant floating aquatic grass is *Paspalidium geminatum*, with other floating plants including *Nymphaea coerulea*, *Pistia stratiotes* and the smallest flowering plant in the world, *Wolffia arrhiza*. The lake supplies Awassa with all its water, and supports a thriving local fishery. The town and lake of Awassa form a popular resort for local and foreign visitors.

Birds

See Box for key species. Significant numbers of congregatory waterbirds occur on the lake, with c.20,000 birds counted along less than 25% of the shoreline in January 1999. It is particularly important for *Fulica cristata*. Over 300 *Leptoptilos crumeniferus* (and 120 nests) were counted in November 1997, the largest concentration of this

species in Ethiopia. The population of this species (and of other waterbirds such as cormorants and pelicans) has risen steadily during the 1990s, probably due to the decline in fish populations in Lake Abijata (site ET048). Other waterbirds occurring in good numbers include *Alopochen aegyptiacus* (1,464), *Dendrocygna viduata* (900), *Plectropterus gambensis* (712) and *Threskiornis aethiopicus* (311). Other species of interest include *Nettapus auritus*, *Ephippiorhynchus senegalensis*, *Circaetus cinereus*, *Falco ardosiaceus*, *Prodotiscus zambesiae*, *Centropus monachus*, *Salpornis spilonotus* and *Lagonosticta rubricata*. Two Ethiopian endemics occur, *Poicephalus flavifrons* and *Lybius undatus*, along with at least seven Afrotropical Highlands biome species: *Oriolus monacha*, *Lybius undatus*, *Nectarinia tacaze*, *Corvus crassirostris*, *Agapornis taranta*, *Passer swainsonii*, *Serinus citrinelloides* and *S. striolatus*.

Key species

	Breeding (pairs)	Non-breeding
A4i <i>Fulica cristata</i>	—	13,000
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds on a seasonal basis.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Awassa is the regional capital, and the site for an important Agricultural College that includes fisheries biology in its curriculum. The college will soon become part of a new University of Southern Ethiopia, the administrative centre for which will be in Awassa. The University complex will include Wondo Genet College of Forestry and the Arba Minch Water Technology Institute. There is serious interest being expressed in introducing biodiversity subjects into the curriculum. Awassa could also prove a good site for formal bird studies. As Awassa is a closed ecosystem, it will be important to monitor the effects of a rapidly expanding urban centre and tourist industry on the natural history of the area. Shallo swamp feeds Lake Awassa, and thus the lake and indeed the town depend on the swamp, which in turn is in urgent need of detailed surveys.

Further reading

Ethiopian Tourism Commission (undated a), Hughes and Hughes (1992), Kebede and Humber (1989), Syvertsen (1995a), Wood and Talling (1988).

Bale Mountains National Park

Admin region Oromiya
 Coordinates 06°45'N 39°43'E
 Area 247,000 ha Altitude 1,500–4,300 m

ET054

A1, A3 (A07), A4i
 National Park

Site description

Bale Mountains National Park is on the south-east Ethiopian plateau, in Bale Zone of Oromiya Region. The zonal capital, Goba, is on the north-eastern side of the park. The park headquarters are on the northern border at Dinsho, 400 km by road from Addis Ababa. The Bale mountains are formed of ancient volcanic rocks that are now dissected by rivers and streams that have cut deep gorges, in some places resulting in beautiful waterfalls. The mountains rise from the 2,500-m plateau to the west, north and east of the park. The Sanetti plateau, which dominates the northern section of the park, reaches 3,800–4,200 m on top of the mountain block, and is broken by several peaks including Tullu Deemtu (4,377 m), the highest mountain in southern Ethiopia and second-highest in the country. Small lakes form in the numerous shallow depressions on the Sanetti plateau during the wet season. Larger, permanent lakes like Garba Guracha, Hora Bacha and Halla Wenz, are mostly found on the eastern side of the plateau. The northern section of the park covers the valleys of the Web and Danka rivers. The northern highland block is separated from the Harennna forest by the spectacular Harennna escarpment that runs diagonally from west to east across the middle of the park. The southern border of the park, at 1,600 m, represents the southern limits of the Harennna forest, the largest intact forest block in the country. Bale Mountains National Park supports a wide range of habitats and encompasses the largest tract of Afro-alpine vegetation in continental Africa. The Harennna forest increases in species-richness from the low-

altitude, open-canopy dry forest at 1,500 m to the very moist, often cloud/mist-covered forest at and above 2,400 m. At these higher altitudes the trees support a high density of epiphytes and woody climbers and, as the canopy is not very dense, a rich herb layer is present. *Juniperus procera* forest is found in the northern parts of the park and also on the east around and above Goba. Around Goba there are also patches of *Olea europaea cuspidata*. The tree-heathers *Erica arborea* and *E. trimera* form a forest (up to 8 m tall) that replaces *Juniperus procera* at c.3,200 m. Such forest is best-developed on the top of the Haremma escarpment where the trees are festooned with lichens, particularly *Usnea*. Above this, only the tree-heathers persist, and then only as scrub 1–3 m tall. This vegetation continues up to the Afro-alpine moorland at 3,800 m. The Afro-alpine moorland in this park is extremely rich in endemic plants, with predictions of 30% highly plausible. The most striking plants are the giant *Lobelia* spp. and cushions of everlasting flowers *Helichrysum* spp., particularly *H. citrispinum* and *H. splendidum*. A shrubby lady's mantle *Alchemilla haumannii* that is endemic to the mountains in southern Ethiopia is also present. The park is used for grazing domestic animals, and consequently fire is used to control the growth of woody vegetation (*Erica* spp.) and to stimulate new growth for grazing. The park contains hot (mineral) springs that the farmers value for their animals. There is also some cultivation of barley to c.3,000 m (sometimes to 3,500 m). The forests are traditionally used for gathering honey and other forest products, and for grazing.

■ Birds

See Box and Table 3 for key species. Bale Mountains National Park is extremely important for its avifauna. Over 265 species have been recorded, including six Ethiopian endemics (*Vanellus melanocephalus*, *Poicephalus flavifrons*, *Dendropicos abyssinicus*, *Macronyx flavicollis*, *Parophasma galinieri* and *Serinus nigriceps*) and many threatened species. Due to its unique diversity and density (4,000 kg/ha) of rodents, the Bale mountains are very important for wintering (and passage) raptors. Both *Aquila clanga* and *A. heliaca* are uncommon migrants with some birds wintering. *Aquila nipalensis*, *A. rapax* and *A. pomarina* have all been recorded on passage and/or wintering. *Circus macrourus* is 'not uncommon' on the moorlands of the Sanetti plateau during passage and in winter, and small numbers of *Falco naumanni* have been recorded at similar times. The area supports the only sub-Saharan population of *Aquila chrysaetos*. *Rougetius rougetii* and *Macronyx flavicollis* are 'not uncommon' residents. The wetlands and moorlands of the Sanetti plateau are particularly important for small numbers (1–4 pairs) of *Grus carunculatus*. Breeding attempts have been reported on the tarns of Sanetti (at c.4,000 m) in the wet season between June and September, with birds leaving the high plateau in the dry season. A unique, isolated sub-Saharan breeding population (c.30–80 birds) of *Tadorna ferruginea* exists on tarns on the Sanetti plateau. The breeding population of 60+ *Pyrhcorax pyrrhcorax* is the southernmost population in Africa. The endemic subspecies *Sylvia lugens griseiventris* frequents the low, scrubby junipers above Goba and elsewhere, and *Corvus ruficollis edithae* occurs, particularly around Goba.

Key species

A1	<i>Aquila heliaca</i>	<i>Rougetius rougetii</i>
	<i>Circus macrourus</i>	<i>Macronyx flavicollis</i>
	<i>Grus carunculatus</i>	
A3 (A07)	Afrotropical Highlands biome: 43 of the 49 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	
A4i	<i>Vanellus melanocephalus</i>	Non-breeding
		Breeding (pairs)
		50+
		—

■ Other threatened/endemic wildlife

Bale Mountains National Park was established to protect two endemic mammals: *Tragelaphus buxtoni* (EN) and *Canis simensis* (CR). *Tragelaphus buxtoni*, an endemic antelope discovered in 1910, thrived under the protection, with the population increasing to c.2,000 by 1990. *Canis simensis* also thrived. However, during the political turmoil of 1991, many *Tragelaphus buxtoni* were killed as some local people demonstrated their resentment of the park. By the end of 1991 the population of this species in the park had been reduced to c.200 animals. *Canis simensis* also suffered and continues to be persecuted. The park supports 68 mammal species (including bats). Other notable taxa include the endemic *Tachyoryctes macrocephalus*, known only from the Sanetti plateau, and *Tragelaphus scriptus meneliki*. The few

collections of reptiles and amphibians from the park have found new records for Ethiopia, as well as undescribed species.

■ Conservation issues

The park was set up in 1970, but has not been legally gazetted. After the population of *T. buxtoni* was devastated in 1991, a local council was established and the killing was stopped. However, cattle were allowed to graze in the Gaysay flats and *T. buxtoni* continues to be disturbed. *Canis simensis* is reportedly hunted on the Sanetti plateau where it is easily accessible from the road that passes through the park. The population is also affected by interbreeding with local dogs, and this has caused canine distemper and rabies. Local people have always used the park, particularly the Sanetti plateau and Haremma forest, but in the 1970s few people lived in the park and now more than 2,500 people and their livestock are resident, particularly in the fertile river valleys in the north and on the Sanetti plateau. Burning of *Erica* spp. has increased, and the grazing pressure on the Afro-alpine moorland is very high. It is hoped that the local council set up to help develop plans for the park will be able to reduce the pressure from human usage on this unique and fragile area. In the Haremma forest there is a conflict between the need for lumber for the wood industry, and the need to conserve the part of the forest that is within the park boundaries. However, a sawmill has been installed at Mena, to the south of the Haremma forest, and the large timber trees are being logged out. There is also an increasing use of the forest to supply construction material, fuel and charcoal for the expanding urban populations in the area.

■ Further reading

Ash (1977), Clouet and Barrau (1993), Clouet *et al.* (1995), Dorst and Roux (1972), Ethiopian Tourism Commission (undated a), Gottelli and Sillero (1992), Hedberg (1957), Hillman (1985, 1993), Kidan (1996), Malcolm (1982), Miede and Miede (1994), Sorenson *et al.* (1996), Waltermire (1973).

Omo National Park

ET055

Admin region Southern Peoples' Region

Coordinates 06°05'N 35°40'E

Area 406,800 ha Altitude 450–1,540 m

A3 (A08)

National Park

■ Site description

Omo National Park is on the west bank of the Omo river in the lower Omo valley. The park is c.140 km long, stretching from the Neruze river in the south to the Sharum plain in the north, and up to 60 km wide where the Park Headquarters are situated. Major land features include the Omo river on the east, the Maji mountains and the Sharum and Sai plains in the north and west, and the Lilibai plains and Dirga Hills to the south. There are three hot springs, and the park is crossed by a number of rivers, all of which drain into the Omo. The important Mui river crosses the middle of the park. Much of the park is at c.800 m but the southern part by the Neruze river drops to 450 m. The highest peak in the Maji mountains is 1,541 m. The edges of the Omo river, which borders the park along its length to the east, are covered by close stands of tall trees including *Tamarindus indica*, *Ficus sycamorus* and *F. salicifolia*, *Kigelia aethiopicum*, *Phoenix reclinata*, *Terminalia brownii*, *Acacia polyacantha* and others. A well-developed shrub layer combined with woody and herbaceous climbers provides dense cover along the edge of the river which, however, is frequently broken by incoming streams and the activities of the local people and animals (particularly *Hippopotamus amphibius*). Away from the river edge, dense stands of *Euphorbia tirucalli* abound, the canopies shading standing water long after the rains have abated. The park also embraces extensive open grasslands interspersed with stands of woodland species, and bush vegetation.

The park is home to the Surma, Kwegu and Dizi peoples, with the Bume making much use of areas in the south and the Mursi crossing the Omo river from the east. These people are pastoralists and hunter-gatherers, but also cultivate a few crops on the river levees, and make extensive use of the river's resources. They hunt wild animals for meat, skins and items to sell, in particular elephant tusks. The lower Omo valley as a whole, including Omo and Mago National Parks, is one of the least-developed in terms of modern-day investments. The poor road network in the region is perhaps one reason why the area has stayed intact. This has assisted in delaying the destruction of the lifestyles of the people who live there as well as the balance of natural

resources on which they depend. The track from Jinka in the east to the edge of the Omo river is only accessible in the dry season (August–February). Another track, from Maji to the Omo National Park on the west, is almost impassable and is mostly used only by Omo National Park vehicles and a few other adventurous visiting groups. Omo National Park was established to conserve the area's rich wildlife and develop the area for tourism. However, the potential of the Omo river (between the two parks) for recreation and tourism activities has not been fully realized. Since the mid-1970s, the National Parks—Omo to the west and Mago to the east of the river—have not been able to attract many visitors, largely as a result of the communication barrier created by the Omo river and the very poor tourist facilities in the parks. This is now being remedied. A ferryboat is being refurbished to take people and vehicles across the river near to the Omo National Park headquarters. As from 1993, the number of visitors coming to the lower Omo has been increasing: private tour companies bring tourists to the edge of the river in the dry seasons. The visitors come to enjoy the wildlife, to meet the Mursi and some of the other ethnic groups, and even to white-water raft on the Omo. A former hunting camp along the high banks of the Omo, in Murle, now serves as a well-maintained safari lodge.

■ Birds

See Box and Table 3 for key species. The current bird list for the park is 312 species. The riverine forest along the Omo river is important for several different bird groups, including herons and egrets, kingfishers, barbets, chats and thrushes, woodpeckers, pigeons, shrikes, warblers and flycatchers. *Halcyon malimbica* is a recent discovery in these forests. Somali–Masai biome species include *Lanius ruficeps*, *Turdus tephronotus*, *Cisticola bodessa*, *Lonchura griseicapilla* and *Plocepasser donaldsoni*. *Phoeniculus damarensis*, *Turdoides tenebrosus* and *T. plebejus* are also present. Palearctic species, especially waders, are fond of the hot springs at Illibai. In the dry grassland around these springs *Cercopsis egregia* has been recorded, one of the few places known for the species in southern Ethiopia. In addition, two species of the Sudan–Guinea Savanna biome have been recorded at this site; see Table 3.

Key species

A3 (A08) Somali–Masai biome species: 31 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International. The current mammal list for the park is 73 species, and the reptile diversity is reportedly high.

■ Conservation issues

Omo National Park is vitally important for the diverse and abundant wildlife, yet it does not have legal status. It was established in 1966 for wildlife protection and until the mid-1970s the park developed successfully. However, during the subsequent 20 years, both the infrastructure and staff morale deteriorated dramatically, and lack of necessary infrastructure, particularly roads, has hampered any recent progress. The European Union has started a pilot development scheme in the region to enhance tourism potential and the capacity of park personnel. The negative impact of fires lit by neighbouring pastoralist communities to clear dense bush has been overstated, even though such fires have sometimes burnt uncontrolled across large areas. The threat posed by shifting cultivation as practised by the local people is debatable as the areas they clear can become too densely covered with thorny and unpalatable plants for either wildlife or domestic animals to penetrate. Other conservation problems include intensive subsistence and commercial hunting, and a lack of dialogue between the authorities trying to establish the park and the people for whom the area is home. The Omo riverbanks are used for flood-retreat cultivation more by the Bodi, Mursi, Bume and Dasenetch peoples than the other ethnic groups. This kind of cultivation is practised after the river waters recede during September. The principal crop is sorghum and the average plot size is c.0.25 ha per household.

■ Further reading

Ash (1976), Enawgaw (1996), Erickson (1982), Ethiopian Tourism Commission (undated b), Fetwi *et al.* (1986), Hillman (1993), Kaji (1979), Netsereab *et al.* (1996), Ono and Doi (1983), Stephenson and Mizuno (1978), Tefera (1994).

Nechisar National Park

ET056

Admin region Southern Peoples' Region

Coordinates 06°00'N 37°45'E

A1, A2 (114), A3 (A04, A08)

Area 51,400 ha Altitude 1,108–1,650 m Proposed National Park

■ Site description

Nechisar National Park is in eastern North Omo Zone. The zonal capital, Arba Minch, is on the western border of the park. Arba Minch is 279 km south-west of the regional capital Awassa and 90 km north of Konso. Nechisar is named after the white grass that covers the undulating Nechisar plains and contrasts with the black basalt rocks of the Amaro mountains to the east, and the black soils of the plains. Around 15% of the park comprises portions of Lakes Abaya to the north and Chamo to the south. The water of Lake Abaya is always brown or red-brown, in contrast with Lake Chamo which has strikingly blue water and white sandy beaches. The park also covers the neck of land between the lakes which supports groundwater forest. The Kulfo river connects the two lakes. At the foot of Mt Tabala in the south-east there are hot springs. The altitude ranges from 1,108 m at the shore of Lake Chamo to 1,650 m on Mt Kalia in the north-east. The main habitats of Nechisar National Park are the lakes, their shorelines, the groundwater forest and connecting river, the dry grassy plains, thick bushland and the wooded valleys and foothills of the Amaro mountains. Most of the park is covered in bushland, which is thick and impenetrable in places, the taller trees including *Combretum* spp., *Dichrostachys cinerea*, *Acacia tortilis*, *Balanites aegyptiaca* and occasional *Acacia nilotica*. In the southern part of the park, *Dobera glabra* and *Acacia tortilis* form open woodland. The grassland is edaphic, the underlying soil being calcareous black clay. The most widespread grass species is *Chrysopogon aucheri*. The forest between the two lakes and by the Kulfo river is dominated by *Ficus sycamorus* up to 30 m tall. This same area supports a number of shrubs and scramblers, but few herbs on the forest floor. The freshwater swamps at the mouth of the Kulfo river and in Lake Chamo are dominated by *Typha angustifolia*, tall waterside grasses, e.g. *Saccharum spontaneum*, and the small leguminous trees, *Sesbania sesban* and *Aeschynomene elaphroxylon*. Arba Minch is an important regional centre and meeting place for people from the southern parts of the Great Rift Valley. There is a crocodile farm near Lake Abaya. Both lakes have good populations of fish, including Nile perch, and there is a small, modern fishing industry. Crocodiles thrive in Lake Chamo and are being culled commercially for their highly prized skins. The local people living on the islands and around the lakes are the Ganjule and Guji. They are variously farmers, pastoralists and fishermen. They use boats made of *Aeschynomene elaphroxylon*. Extensive areas to the west of Lake Abaya were cleared in the 1960s and 1970s to establish large-scale mechanized farms for cotton and other lowland crops.

■ Birds

See Box and Tables 2 and 3 for key species. *Falco naumanni* occurs on passage, with a few birds possibly wintering. Similarly, *Circus macrourus* is fairly common on passage, with some wintering. Small numbers of *Phoenicopterus minor* occur on Lakes Chamo and Abaya. Somali–Masai biome species typical of bushland habitats include *Phoeniculus somaliensis*, *Lanius dorsalis* and *Cisticola bodessa*. The open plains support three species that are little known in Ethiopia: an isolated population of *Mirafraba albicauda* (unknown elsewhere in Ethiopia), the endemic *Caprimulgus solala* (known from just one record) and the rare *C. stellatus*. The plains support populations of two other nightjars, *Caprimulgus fraenatus* and *C. donaldsoni*. The south-western corner of Lake Abaya supports one of only two Ethiopian populations of *Myrmecocichla albifrons*. Other notable species include *Aviceda cuculoides*, *Macheiramphus alcinus*, *Chelictinia riocourii*, *Gypaetus barbatus*, *Accipiter ovampensis*, *Francolinus levaillantii*, *Podica senegalensis*, *Schoutedenapus myoptilus*, *Coracina caesia* and *Serinus reichardi*.

Key species

A1	<i>Circus macrourus</i>	<i>Phoenicopterus minor</i>
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.	
A3 (A04)	Sudan–Guinea Savanna biome species: One of the 16 species of this biome known from Ethiopia has been recorded at this site; see Table 3.	
A3 (A08)	Somali–Masai biome species: 25 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

Nechisar National Park was established to protect the threatened mammal subspecies *Alcephalus buselaphus swaynei* (EN), as well as for its scenic beauty, and supports populations of at least 37 mammal species.

Conservation issues

The National Park was proposed in 1967 and has been under development since 1972. It is still waiting to be gazetted. Until 1991, the park was one of the best-protected areas in the country, with minimal human use of its resources. The situation has since altered dramatically and heavy resource use now threatens its future. The fast growth of Arba Minch town has caused the rapid loss of trees, particularly from the groundwater forest, both for fuel and construction. Other problems include grazing by domestic stock on the eastern boundary of the park, and illegal fishing in the parts of the lakes adjoining the park. Nechisar was previously administered from Addis Ababa with minimal interaction with local people and authorities. Arba Minch is the zonal administrative centre and houses two institutions of tertiary education: Arba Minch Water Technology Institute and a Teacher Training Institute. More direct involvement of the town and these institutions in activities to conserve and protect the flora and fauna of Nechisar could do much to improve the attitude of the local people towards the park. Arba Minch Water Technology Institute trains water engineers for work throughout Ethiopia. The park includes the waters of both Lakes Abaya and Chamo and offers a good opportunity to introduce both formal and informal environmental education activities for the students of this institution and that of the Teacher Training Institute.

Further reading

Ash (1992), Duckworth *et al.* (1992), Hillman (1993), Safford (1993), Safford *et al.* (1993, 1994), Tesfaye (1985).

Genale river

Admin region Oromiya

Coordinates 05°44'N 39°32'E A1, A2 (113, 114), A3 (A08)

Area Undefined Altitude 800–1,500 m Unprotected

ET057

Site description

This site comprises the middle section of the Genale river which forms the border between Bale and Borena Zones, and lies to the east of the Borena Zonal capital, Negele. This section of the river stretches as far north as the Sidamo–Bale bridge, where the track from Goba crosses the river, and south to the Baratieri falls, where the river crosses into El Kere Zone of Somali Region. The Genale river forms a major part of the Genale–Dawa–Weyb basin, the third-largest in the country in terms of land area, draining 168,000 km² of southern Ethiopia. The river rises in the Sidamo highlands, flowing south-east to Dolo on the Somalia border. The major tributaries are the Welmel, Dumal and Web, all originating in the Bale mountains. The lower section of the Genale river valley is described under Bogol Manyo–Dolo (site ET068). The Sidamo–Bale bridge, at 1,200 m, is at the head of a wide, gently sloping valley over 100 km long, which ends with the Baratieri falls at c.800 m. The sides of the valley rise to over 1,500 m and are especially steep on the western side towards Negele. Little is known about the vegetation in this area. Open woodland dominated by various *Acacia* spp. prevails in the middle Genale basin, and riparian vegetation occupies a narrow strip along the river. The largest trees are probably *Ficus sycamorus*, *Mimusops kummel* and *Tamarindus indica*. There are probably also reedbeds and other aquatic plants in the riverbed. The gently sloping valley floor is used for rain-fed and irrigated crop production, and many domestic animals graze in the valley.

Birds

See Box and Tables 2 and 3 for key species. This area is important for *Tauraco ruspolii* and *Streptopelia reichenowi*. *Tauraco ruspolii* has been found in the north of the site, near where the Goba–Negele road crosses the Genale river. Both *Streptopelia reichenowi* and *Ploceus dichrocephalus* are suspected to occur beside and along the riverbed. A survey in July 1996 recorded 97 species, including *P. dichrocephalus*. *Accipiter ovampensis* is also known to occur.

Key species

A1	<i>Tauraco ruspolii</i>	<i>Streptopelia reichenowi</i>
A2 (113)	Jubba and Shabeelle valleys EBA: Two of the three species of this EBA that occur in Ethiopia have been recorded at this site; see Table 2.	
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.	
A3 (A08)	Somali–Masai biome species: 22 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Conversion to agriculture, especially beside and along the riverbed (the suspected habitat of *Streptopelia reichenowi* and *Ploceus dichrocephalus*), is the most critical problem. Deforestation is also a significant problem. The valley is a natural border between the southern slopes of the Bale massif and the Ogaden, and the Sidamo and Borena areas. How people use this section of the Genale river needs to be determined if a sustainable conservation programme for the ecosystem is to be formulated.

Further reading

Ethiopian Wildlife and Natural History Society Survey Team (1996).

Anferara forests

Admin region Oromiya

Coordinates 05°43'N 38°59'E

Area 106,568 ha

Altitude 1,400–2,250 m

ET058

A1, A2 (114)

National Forest Priority Area

Site description

The Anferara forests are around Negele–Borena, 310 km south-east of Awassa and 470 km from Addis Ababa, in Borena Zone. This area encompasses the Anferara–Wadera forest and the adjacent Bore–Anferara forest which together represent the majority of the high-elevation forest in southern Ethiopia. These forests are on the highlands between two big river systems: the Genale to the east and the Awata (a major tributary of the Dawa river) on the west. The topography is rugged and broken, with many hills and ridges making it unsuitable for agriculture. However, the Kebre Mengist–Bogol Manyo (in the Genale river basin) road crosses the area. The forests are not uniform. In the north, towards Agere Selam and Kebre Mengist, the largest tree is *Podocarpus falcatus*, growing with a range of broadleaved species such as *Croton macrostachyus*, *Hagenia abyssinica*, *Ilex mitis*, *Olea capensis*, *Schefflera abyssinica* and *Syzygium guineense afromontanum*. Further south, where the rainfall is higher, *Aningeria adolfi-friderici* is found; this is the tallest and most important tree of these forests. The canopy below comprises *Albizia gummifera* and other *Albizia* spp., *Celtis africana*, *Ekbergia capensis*, *Fagaropsis angolensis*, *Ocotea kenyensis*, *Olea capensis*, *Phoenix reclinata*, *Polyscias fulva* and *Prunus africana*. There are also many smaller trees and shrubs making this wet forest floristically rich. Near Negele the vegetation is dry montane forest that used to be dominated by *Juniperus procera*, although this has nearly all been cut leaving scrub and a few trees of other species, primarily *Barbeya oleoides*, *Catha edulis*, *Olea europaea cuspidata*, *Pistacia aethiopica*, *Pittosporum* spp. and *Schrebera alata*. The forest here is very open, verging on woodland or scrub. All the forested areas are fringed with woodlands that are described under the Liben plains and Negele woodlands (site ET062).

Birds

See Box and Table 2 for key species. The northern distribution of *Tauraco ruspolii* encompasses parts of both Anferara–Wadera forest and the adjacent Bore–Anferara forest. Together, these forests are thought to hold the majority of the species' population. *Tauraco ruspolii* appears to be a forest margin and woodland species typically occurring between 1,400 and 1,850 m. Most observations were close to 1,500 m, where its preferred habitats are forest margins and woodlands as well as *Juniperus*. Other species of note are *Serinus xantholaema* (very uncommon) and *Emberiza affinis*.

Key species

A1	<i>Tauraco ruspolii</i>	<i>Serinus xantholaema</i>
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The Anferara forests are both designated as National Forest Priority Areas (NFPA). However, this does not mean that the area is conserved. An NFPA is defined as an area from where local people and their animals should be excluded, and neither has been practical in this case. The Anferara forests are currently one of the main sources for timber of *Aningeria adolfi-friderici* and *Podocarpus gracilior*, which are being harvested with sawmills in the forest. Although some attempts to introduce sustainable harvesting methods have been made on paper, in practice the areas harvested are usually clear-felled, leaving insufficient cover for regeneration of tall forest trees, particularly *Aningeria adolfi-friderici*. The primary threat to the area is the rapidly increasing (8.3% per year) human population (16,900 people in 1,600 households during 1990) living within the forest. These people make a living from cutting trees for charcoal, timber or fuel. They also clear the forest for cropland and grazing. Honey production has also proved destructive: large areas of forest have been burnt when fires used to smoke the hives during honey collection burn out of control. Open-cast gold mining poses an additional threat to the ecosystem. A comprehensive land-use plan is urgently needed for both Anferara forests, accommodating the various interests of the local people and the government in the uses of the forest and associated woodlands. As the only protected areas in the country supporting these forest-types (and associated species), there may be significant ecotourism potential for the site, a proposition that may be attractive to the Regional and Zonal Governments.

Further reading

Borghesio (1997a, b), Friis (1992), Haugen and Torstein (1992).

Mago National Park

Admin region Southern Peoples' Region

Coordinates 05°38'N 36°09'E

Area 216,200 ha Altitude 400 m

ET059

A3 (A04, A08)
National Park

Site description

Mago National Park is in South Omo Zone, 35 km south-west of Jinka, the administrative centre of the Zone. The park lies to the north of a large 90° bend in the Omo river. To the west is the Tama Wildlife Reserve, with the Tama river forming the boundary. South of the Omo river is the Murle Controlled Hunting Area, with an important wetland—Lake Dipa—beside the river. The Mago river flows through the centre of the park and joins the Neri river at Mago swamp, before continuing southwards as the Usno to join the Omo river. The river, which is 760 km long, originates in the central, south-western highlands of Ethiopia, where it is known as the Gibe. Its final destination is Lake Turkana, close to the Kenyan border. The altitude at the edge of the park is c.400 m. To the east are the Mursi Hills, rising to over 1,600 m. North of the Neri river are the Mago mountains with the highest point, Mt Mago, at 2,528 m. The south-eastern quarter of the park is crossed by many small streams and rivers. The headquarters for the park are by the Neri river, near the entrance from Jinka. The main habitats of the park and surrounding area are the rivers and riverine forest, the wetlands of Mago swamp and Lake Dipa, the bushland, savanna grassland and open grassland on the more level areas, and bushland and scrub on the sides of the hills. Open grassland comprises just c.9% of the area, the rest of the area being described as 'very dense'. The largest trees are found in the riverine forest beside the Omo, Mago and Neri. Areas along the lower Omo (within the park) are populated with a rich diversity of ethnic groups including the Ari, Banna, Bongoso, Hamer, Karo, Kwegu, Male and Mursi peoples. A number of these groups live beside the river and make extensive use of its natural resources and its levees to grow crops.

Birds

See Box and Table 3 for key species. The park list currently stands at 301 species, including Somali–Masai biome species such as *Acryllium vulturinum*, *Trachyphonus darnaudii*, *T. erythrocephalus*, *Mirafra hypermetra*, *M. poecilosterna*, *Tchagra jamesi*, *Lanius dorsalis*, *Prinia somalica*, *Nectarinia nectarinioides*, *Plocepasser donaldsoni* and *Speculipastor bicolor*. Sudan–Guinea Savanna biome species are represented by the extremely uncommon *Turdoides tenebrosus* in dense riparian thicket at Lake Dipa and elsewhere, and *Estrilda troglodytes* in rank grass along streams and swamp edges. Other species of interest include *Phoeniculus damarensis*, which has a very limited distribution in the south of the country, *Porphyrio alleni* (at least 50) and *Butorides striatus* (80+) at Lake Dipa, *Pluvianus aegypticus* and *Scotopelia peli* along the Omo river and *Cossypha niveicapilla* in the undergrowth of riverine forest.

Key species

A3 (A04) Sudan–Guinea Savanna biome species: Four of the 16 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

A3 (A08) Somali–Masai biome species: 28 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

The park was established to conserve large animals of the open plain, particularly *Damaliscus lunatus korrigum* (VU) and *Alcelaphus buselaphus lelwel* (LR/cd). A total of 56 species of mammal have been recorded.

Conservation issues

Throughout the lower Omo basin, including Mago and Omo National Parks, subsistence agriculture, shifting and flood-retreat cultivation, pastoralism, wildlife conservation, tourism and mechanized farming comprise the most significant forms of land use. With increasing population pressure exacerbated by the occasional inflow of peoples from neighbouring areas, there are severe conflicts of interest for the use of the natural resources.

Further reading

Atkins (1996a), Demeke (1996), Erickson (1982), Fetwi *et al.* (1986), Hillman (1993), Netsereab *et al.* (1996), Ono and Doi (1983), Shimelis and Sileshi (1998), Stephenson and Mizuno (1978), Turton (1995).

Lower Wabi Shebelle river and Warder

Admin region Somali

Coordinates 05°21'N 44°39'E

Area Undefined Altitude 250–1,000 m

ET060

A1, A2 (113), A3 (A08)

Unprotected

Site description

The Wabi Shebelle is the main river in central Somali Region. Rising between the Arsi and Bale mountains, it curves round the Bale massif and flows south-east to Somalia. This site, i.e. the lower section of the Wabi Shebelle, starts at Imi. It then continues for more than 300 km through Gode, Kelafo and Mustahil, dropping gradually to c.250 m near the Somalia border. In this area, the Wabi Shebelle and its main seasonal tributary from the east, the Fafen, cut through a series of wide, flat shelves of sedimentary rock. These are often overlain, as in the Gode valley, by deep, alluvial soils. The highest areas, at around 1,000 m, are east of the Fafen river. Between Imi and Kugno, *Tamarix* spp. and *Terminalia brevipes* grow together. Below this, and towards Kelafo, the river flows through a flat plain where the riverbanks and adjacent land are subject to seasonal inundation. Such areas are often covered in a tangled growth of small bushes and herbs that include wild relatives of cotton. At Kelafo, the river cuts through and runs parallel to a low limestone ridge with *Acacia–Commiphora–Boswellia* bushland on it. In the Mustahil area, the river forms flood-plains: these are covered with tall herbaceous vegetation comprising various salt-tolerant species, e.g. *Schoenoplectus maritimus* and other sedges, *Limonium* spp., shrubby *Indigofera* spp., climbers, and various grasses. Grasses dominate the areas around the flood-plains. Away from the river basin, the vegetation is mostly *Acacia–Commiphora–Boswellia* bushland. This association contains some interesting succulents, not least several endemic species of *Jatropha* and *Euphorbia*.

Birds

See Box and Tables 2 and 3 for key species. Within this area *Eupodotis humilis* is not uncommon, and *Streptopelia reichenowi* is locally fairly common. *Sylvietta philippae* is considered rare, and is only known from Warder. The site supports a number of Somali–Masai biome species that are little known or relatively uncommon elsewhere in Ethiopia. In addition to the three species mentioned above, biome species include *Merops revoilii*, *Pseudalaemon fremantlii*, *Eremopterix signata*, *Neotis heuglinii*, *Oenanthe phillipsi*, *Nectarinia hunteri*, *N. nectarinioides*, *Ploceus bojeri*, *Passer castanopterus*, *P. gongonensis* and *Speculipastor bicolor*. *Spizocorys personata*, *Mirafraga collaris* and *Tmetothylacus tenellus* have also been recorded. Other species of interest include *Charadrius mongolus*, *Rhinoptilus chalcopterus* and *Turdoides squamulatus*. There is also an as-yet-identified greenbul living in the riverine thickets, and if *Laniarius liberatus* were to be found in Ethiopia then this would be the most likely site.

Key species

A1	<i>Eupodotis humilis</i>	<i>Sylvietta philippae</i>
	<i>Streptopelia reichenowi</i>	
A2 (113)	Jubba and Shabeelle valleys EBA: One of the three species of this EBA that occur in Ethiopia has been recorded at this site; see Table 2.	
A3 (A08)	Somali–Masai biome species: 47 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

What little is known of the vegetation in this area is sufficient to show that there are many species restricted to these arid areas which are either very poorly known, or new to science. Examples include *Boswellia ogadensis*, first collected from Kelafo, and not known from any other locality, and *Acacia pseudonigrescens*, known only from between Kelafo and Mustahil. Several species of *Jatropha* and *Euphorbia* are endemic to this part of Somali Region in Ethiopia, or also to neighbouring areas of Somalia.

Conservation issues

Away from the river, very little is known about the flora or fauna of this area. It is quite possible that vegetation through much of the area has come under increasingly severe pressure as a result of population increases, particularly from refugees, as well as from agricultural development schemes. The most important plant in the area is *Cordeauxia edulis*, a small tree (up to 2.5 m) that can grow on almost pure sand with less than 200 mm of rain a year. It has a highly nutritious fruit that is much prized by the local people. Once ripe, the nuts are collected and boiled or roasted to preserve them. Nothing has been done to determine the status of this plant, or indeed ensure its conservation. There is much to be done to document the wildlife, and determine conservation priorities in this area.

Further reading

French Ministry of Foreign Affairs and National Water Resources Commission (1973, 1974).

Mankubsa–Welenso forest

ET061

Admin region Oromiya

Coordinates 05°15'N 39°33'E

Area 17,780 ha

A1, A2 (114), A3 (A08)

Altitude 1,400–1,650 m

National Forest Priority Area

Site description

Mankubsa–Welenso forest is near the Negele–Arero track between 20 and 40 km south of Negele town, the capital of Borana Zone. Negele is over 310 km south-east of Awassa. The area is on a plateau at the western edge of the Liben plains (site ET062). The forest is dominated by *Juniperus procera*, which forms a relatively open canopy at 25 m. *Juniperus procera* dominated forests are more usually found at higher altitudes than at Mankubsa–Welenso. Other species that form a lower stratum include various *Acacia* spp., *Olea europea cuspidata*, *Combretum* spp., *Maytenus* sp., and *Rhus* sp. A ground-cover of tall grasses includes *Hyparrhenia* spp. and *Cymbopogon* spp. The soils in this area are shallow sands and gravels, and as a consequence are easily eroded.

Birds

See Box and Tables 2 and 3 for key species. *Tauraco ruspolii* and *Serinus xantholaema* both occur, but are uncommon. Among Somali–Masai biome species known from the area are *Calandrella somalica*, *Cisticola bodessa*, *Sylvia boehmi* and *Sylvietta isabellina*. Other species of interest recorded from the site include *Accipiter ovampensis* and *Nectarinia erythrocerca*. In addition, one species of the Sudan–Guinea Savanna biome has been recorded at this site; see Table 3.

Key species

A1	<i>Tauraco ruspolii</i>	<i>Serinus xantholaema</i>
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.	
A3 (A08)	Somali–Masai biome species: 30 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

Mankubsa is formally protected as a National Forest Priority Area. However, the removal of trees and crop cultivation has reduced the extent of the forest, and overgrazing hampers natural regeneration. Trees are cut for timber and fuel, both being sold in nearby Negele town. Borano–Oromo pastoralists use fire to eradicate ticks from the forest and improve grazing for their animals, further threatening the integrity of the forest.

Further reading

Ethiopian Wildlife and Natural History Society Survey Team (1996), Syvertsen (1990), Wirtu and Meskek (1992).

Liben plains and Negele woodlands

ET062

Admin region Oromiya

Coordinates 05°15'N 39°41'E

A1, A2 (114), A3 (A08)

Area Undefined Altitude 1,000–2,000 m

Unprotected

Site description

The Liben plains are an extensive area of flat land that stretches east and south of Negele, the capital of Borana Zone. Negele is over 310 km south-east of Awassa. The plains have formed over an area of bedrock (which includes limestone) between the Genale and Dawa rivers. Excepting some artificial ponds, there are no significant water-bodies in this area. Starting at 1,000 m at the edge of the Genale river gorge, the ground rises gently to over 2,000 m. The site is centred on a flat area at 1,500–1,550 m, 10–40 km south-east of Negele town. Woodlands (comprising small trees and shrubs) border the area, more than 95% of which is covered with long grass and scattered *Acacia* bushes. Little is known of the plant species involved. The plains have previously been used as a military training site and had a military airport.

Birds

See Box and Tables 2 and 3 for key species. *Heteromirafraga sidamoensis* is known only from this area. It has been found 12 km south-east and 2 km south of Negele. Birds probably referring to this species have been seen at other locations nearby on the tracks to Arero and Filtu. A survey in June 1996 recorded 44 species, including *Calandrella somalica*, *Cisticola nanus* and *Neotis heuglinii*. Other Somali–Masai biome species known to occur include *Nectarinia hunteri*, *Tmetothylacus tenellus*, *Batis perkeo* and *Laniarius ruficeps*. *Spreo albicapillus* and *Passer motitensis* have been recorded breeding. The site is also a known location for the uncommon *Francolinus coqui*.

Key species

A1	<i>Heteromirafraga sidamoensis</i>
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.
A3 (A08)	Somali–Masai biome species: 18 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

The Liben plains and Negele woodlands are unprotected. The major threats to the site are from the development of new settlements. However, there are plans to develop part of the area as a new airport for Negele. The Borana–Oromo pastoralists use the area to graze their animals, the woodlands being important to them in the dry season. However, the woodlands can also harbour ticks, hence, before the vegetation dries, the Borana burn the area to control the ticks without destroying the trees and bushes.

■ Further reading

Ash and Gullick (1989), Ash and Olson (1985), Collar and Stuart (1985), Erard (1975b), Ethiopian Wildlife and Natural History Society Survey Team (1996), Friis (1992), Haugen and Torstein (1992), Robertson (1995).

Konso–Segen

Admin region Southern Peoples' Region

Coordinates 05°15'N 37°45'E

Area Undefined Altitude 800–2,000 m

ET063

A1, A3 (A08)

Unprotected

■ Site description

Konso is a special Wereda in North Omo Zone. The main village of the Konso people is Karat, 90 km south of Arba Minch. The seasonal Segen river (which originates in Lake Chamo) flows through Konso (1,640 m) on its way to join the Weyto, and then terminating in Lake Chew Bahir. The Segen river circles the Konso hills. Segen village sits on top of a highland area c.40 km north of Konso. The Konso hills are an old volcanic area that contains large blocks of marble. The hills are highly dissected and covered with scrubby vegetation, largely comprising broadleaved species. The most common small trees and shrubs are *Combretum* spp. and *Terminalia* spp. There are also several species of *Acacia*. The most disturbed areas have only bushes and often get covered with aggressive climbers like *Pterolobium stellatum*. On exposed rocky areas there are clumps of *Aloe* spp. Bushland and thickets are found on the lower parts of the Konso hills and in patches in the Segen valley. *Acacia* and *Commiphora* spp. are common, along with some *Grewia* spp. Where they have not been cleared, the banks of the Segen have luxuriant riverine vegetation with tall trees of *Ficus sycamorus*, *Tamarindus indica*, *Mimusops kummel* and *Garcinia buchananii*, and many small trees and shrubs, all of which can be festooned with climbers, particularly cucurbits and the intriguing legume, *Clitoria ternatea*. The Konso people have a unique and sustainable agricultural system that involves the building and maintaining of stone terraces and careful fertilization (with manure) of the fields. A central feature of their fields is the endemic tree crop called *Moringa stenopetala*. The main annual crop is sorghum, along with some root crops and cotton. The women maintain the stone walls and care for the crops, while the men build and maintain the houses, spin and weave, and carve.

■ Birds

See Box and Table 3 for key species. The site supports at least 120 species, many of which are Somali–Masai biome species. The northern side of the Segen river is the type- and only locality for *Mirafra pulpa* in Ethiopia. The species has not been recorded since it was first collected in 1912. Other species of interest are *Gypaetus barbatus*, *Melierax metabates*, *Lonchura griseicapilla*, which has a distribution limited to the south of the country, and *Serinus reichardi*. In this area *Pycnonotus barbatus schoanus* of the western highlands and Great Rift Valley is replaced by *P. barbatus dodsoni*, which occurs across to Yabello and the east. There appears to be no hybrid zone, suggesting species-level status for each taxon. However, the situation regarding these two forms requires further study in the area. It is also possible that *Melierax canorus* and *M. metabates* occur more or less alongside each other in this area, with *M. metabates* occurring to the west and *M. canorus* to the south-east of the Konso hills.

Key species

A1 *Mirafra pulpa*

A3 (A08) Somali–Masai biome species: 26 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

None known to BirdLife International.

■ Conservation issues

Hunting, clearance for agriculture, overgrazing and excessive soil erosion are major threats to the biodiversity of the area. Undisturbed woodlands cannot be found in the Konso area. It is possible that the increase in population has put great demand on the trees of the area. However, the most likely cause of deforestation is the demand for fuelwood and charcoal in expanding centres like Arba Minch, and the introduction of a cash economy to the Konso peoples. The demand for wood for carving could rise dramatically, as Konso is an area attracting increasing numbers of adventurous tourists. The wooden totem figures made to commemorate the dead are particularly sought after.

■ Further reading

Ash (1992), Syvertsen (1995b).

Yabello Sanctuary

Admin region Oromiya

Coordinates 04°55'N 38°25'E

Area c.250,000 ha Altitude 1,430–2,000 m

ET064

A1, A2 (114), A3 (A08)

Wildlife Sanctuary

■ Site description

Yabello Sanctuary lies 10 km east of Yabello town in Borana Zone, with the Yabello–Arero road passing through its southern part. Precise boundaries for this protected area have not been set. Most of the area is at c.1,700 m, although the topography is broken and varies between 1,430 and 2,000 m. The area is notable for its red soils which have little organic matter. The general vegetation-type is *Acacia* savanna, the major trees being *A. drepanolobium* on black cotton soil, and *A. brevispica* and *A. horrida* on the slopes. There are also patches of *Balanites aegyptiaca*, and several species of *Commiphora* and *Terminalia* are found at the lower altitudes. The higher parts of the hills used to be covered with *Juniperus procera* and *Olea europaea cuspidata* forest. However, only a few patches remain, most of the trees having been cut and the wood taken for construction and other purposes. The dominant land-use is pastoralism, as practised by the Borana people.

■ Birds

See Box and Tables 2 and 3 for key species. Yabello Sanctuary is an important protected area for *Hirundo megaenis* and *Zavattariornis stresemanni*, both of which are fairly common, but are confined to this general area. The two species occupy similar habitats, namely open, arid, short-grass country with scattered low *Acacia* bushes and, in spite of recent land-use changes, neither appears to be under any particular threat. *Hirundo megaenis* breeds in the main rainy season during April–May, with nests found on rafters inside traditional houses in the Yabello area. There are old records of *Falco fasciimucha* from the Yabello hills, but none since 1942. During a brief survey in June 1996, 210 species were recorded in the area, including 56 Somali–Masai biome species, many of which appear to be very common. Other interesting species include *Francolinus levaillantoides*, *Campethera cailliautii* and *Anthus caffer*. *Caprimulgus donaldsoni* and *C. stellatus* may also occur within the area. In addition, one species of the Sudan–Guinea Savanna biome has been recorded at this site; see Table 3.

Key species

A1 *Hirundo megaenis*

Zavattariornis stresemanni

A2 (114) South Ethiopian highlands EBA: Two of the five species of this EBA have been recorded at this site; see Table 2.

A3 (A08) Somali–Masai biome species: 63 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

■ Other threatened/endemic wildlife

Alcelaphus buselaphus swaynei (EN) is apparently still present, although very few have been found since 1970. Surveys in 1990 recorded 25 mammal species.

■ Conservation issues

The Sanctuary was set up to afford protection to the endemic *Alcelaphus buselaphus swaynei*. Although designated as part of the official protected-area system, very little has been done to develop the infrastructure of the Sanctuary. For example, all the park staff live 10 km away in the town of Yabello. Responsibility for conservation of such areas now resides with the Regional Government, so it is hoped that more

attention can be given to developing such areas through collaboration among the Regional and Zonal Bureau, and the local communities.

Further reading

Ash and Gullick (1989), Boka (1996), Collar and Stuart (1985), Collar *et al.* (1994), Dellelegn (1990), Haugen and Torstein (1992), Hillman (1993), Hundessa (1991), Syvertsen (1991), Syvertsen and Dellelegn (1991), Yigezu (1996).

Arero forest

Admin region Oromiya

Coordinates 04°47'N 38°52'E

Area 10,650 ha

A1, A2 (114), A3 (A08)

Altitude 1,500–1,740 m

National Forest Priority Area

ET065

Site description

The site is located around Arero town in the centre of Borena Zone. Arero is about halfway along the track from Negele to Yabello, and 660 km from Addis Ababa. The topography of the area is undulating, with some hills and gorges. Arero forest is the most southerly of the high forests of Ethiopia and is one of the few places in Borena Zone where there are well-grown trees of *Juniperus procera*. *Podocarpus oracilior* and *J. procera* are the largest trees and are found with broadleaved species, e.g. *Prunus africana*, *Teclea nobilis*, *Croton macrostachyus*, *Olea capensis*, *Acacia* and figs. This forest also contains several species of small tree characteristic of the Somali–Masai vegetation of Somalia, eastern Kenya and northern Tanzania. Examples are *Fagaropsis hildebrandtii* and the yellow-flowered *Ochna insculpta*. In Ethiopia, *Ochna insculpta* is only known from the Arero forest. Several tall grasses (*Andropogon* sp., *Hyparrhenia* spp. and *Cymbopogon* spp.) grow in the periphery of the forest and in woodland. In 1992 this area comprised 5,437 ha of closed-canopy forest, 2,389 ha of medium-density forest and 2,823 ha of open forest.

Birds

See Box and Tables 2 and 3 for key species. Arero forest was previously the most important known site for *Tauraco ruspolii* (and possibly represents the type-locality), although the species has now been found at Negele, Wadera, Genale and Kibre Mengist. Although forest at this site is being lost, the area still supports a small population, the southernmost in the species' range, and is believed to be more or less contiguous with that of the Anferera forests (site ET058); together these encompass the species' full range. Another important bird found at the site is *Serinus xantholaema*, which although uncommon has recently been found breeding at Arero, the first breeding record for Ethiopia. A recent survey recorded 168 species at the site, of which 43 were Somali–Masai biome species including *Turdus tephronotus*, *Cisticola bodessa*, *Sylvia boehmi*, *Cisticola nanus*, *Batis perkeo*, *Turdoides aymeri*, *Parus thruppi*, *Dryoscopus pringlii*, *Onychognathus salvadorii*, *Lamprotornis shelleyi*, *Pseudonigrita cabanisi* and *Serinus donaldsoni*.

Key species

A1	<i>Tauraco ruspolii</i>	<i>Serinus xantholaema</i>
A2 (114)	South Ethiopian highlands EBA: One of the five species of this EBA has been recorded at this site; see Table 2.	
A3 (A08)	Somali–Masai biome species: 43 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

The forest is heavily populated and is connected to expanding urban centres (e.g. Metagefersa) by road. Consequently there is heavy logging of the large trees (with truckloads of timber being seen taken from the forest), while the smaller ones are taken for local construction, fuel and charcoal production. Although the forest is a National Forest Priority Area, and therefore should play an important role in protecting endangered species, the protection afforded the area is not sufficient to prevent the cutting, clearing for settlements and fires that currently threaten the forest. Where forest cover has been removed, the soil has dried out and no forest regeneration can be seen. There also seems to have been a lowering of the water-table in the Arero area. In an effort

towards conservation, a *Eucalyptus camaldulensis* and *Juniperus procera* plantation was established in 1982. However, the survival rate of these species was very low and further efforts have not been attempted. A management plan for the forest has been prepared, but control measures urgently need to be put in place if the forest is to be saved.

Further reading

Borghesio (1997a, b), Friis (1992), Moreau (1958), Torstein (1992), Wirtu and Meskel (1992), Yilma (1991).

Dawa–Wachile

Admin region Oromiya

Coordinates 04°43'N 39°11'E

Area Undefined Altitude 1,000–1,100 m

A1, A2 (113), A3 (A08)

Unprotected

ET066

Site description

The Dawa river and Wachile plains are in southern Borena Zone. A bridge crosses the Dawa river on the Negele–Arero road, 50 km from Wachile. Wachile village is a natural meeting place for traders and travellers in the area with Mega, Moyale, Arero and Negele all within 150 km. The topography of the site is a combination of very flat plains, river valley and some hills. The Dawa river is the largest tributary of the Genale river and forms part of the Genale–Dawa basin. It drains nearly a third of Genale's 168,000 km² basin area and has a total length of 450 km. The flow of the river, like the rains over the catchment, is highly seasonal. The Dawa river starts as the Mormora and Awata rivers that flow down the eastern slopes of the Sidamo mountains (that support the Anferera forests, site ET058) between Dila and Bore. The Dawa river then loops round in a south-easterly direction until it joins the Ethiopia–Kenya border near Melka Mure and continues east along the border for 150 km until joining the Genale river at Dolo on the Ethiopia–Somalia border. A number of seasonal rivers and streams feed into the Dawa. The largest trees in the riverine forest along this lower section of the Dawa river are *Diospyros mespliformis*, *Ficus sycamorus*, *Mimusops kummel*, *Tamarindus indica* and African mahogany *Trichilia emetica*. Shrubs of *Ficus capreaefolia* cover much of the bank, and there are reedbeds in the river. The Wachile plain is mostly covered with bushland and thickets. Most of the species remain bare during the long dry season making evergreen species such as *Acokanthera schimperi*, *Dobera glabra*, *Euclea racemosa schimperi* and *Salvadora persica* highly conspicuous. The more numerous deciduous species primarily comprise *Acacia* spp., *Commiphora* spp., *Boswellia microphylla* and *B. neglecta*. Some trees emerge above these bushes. Species of particular interest in this area are *Delonix elata*, *Kirkia tenuifolia*, *Melia volkensii* and *Terminalia orbicularis*, with *Terminalia polycarpa* on the rocky slopes. The whole area is too dry for crops to grow, and consequently the Borena people have formed a highly developed pastoralist society. There are many small ponds built by the local people to provide water over a wide area for their animals. They also have very deep hand-dug wells that tap underground water. The other important economic activity throughout the dry southern parts of Borena is the collection of gums and resins, particularly from trees of *Commiphora* and *Boswellia*.

Birds

See Box and Tables 2 and 3 for key species. This area is important for *Streptopelia reichenowi*, which is found along the Dawa river, particularly to the north of the bridge, where more than 30 have been recorded in stands of riverine trees. *Ploceus dichrocephalus* is found in the same area as *S. reichenowi*, breeding in the reedbeds along the Dawa river. So far, 45 Somali–Masai biome species are known from the site. During a survey in June 1996, *Tmetothylacus tenellus*, *Dryoscopus pringlii*, *Laniarius ruficeps*, *Turdus tephronotus*, *Cisticola nanus*, *Batis perkeo*, *Nectarinia hunteri* and *Nectarinia nectarinioides* were all found in the arid *Acacia* bush and scrub habitats of the Wachile plains. A yet-to-be-identified species of babbler has been found in the riverine thicket below the Dawa river bridge.

Key species

A1	<i>Streptopelia reichenowi</i>
A2 (113)	Jubba and Shabeelle valleys EBA: Two of the three species of this EBA that occur in Ethiopia have been recorded at this site; see Table 2.
A3 (A08)	Somali–Masai biome species: 49 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.

Other threatened/endemic wildlife

None known to BirdLife International.

Conservation issues

No conservation efforts have been noted in this area. The Borena breeds of cattle and sheep are highly prized, both nationally and as export products. The vegetation has been managed in a sustainable fashion (i.e. without overgrazing) for a long time by the Borena pastoralists, but development programmes that were designed and implemented without any real understanding of Borena society and its traditional management practices have to some extent created the problems now faced by these people and this area (such as overgrazing, inappropriate irrigation initiatives and gold mining). Any attempts to introduce irrigated agriculture using the very variable flow of the Dawa river or groundwater could have very marked negative effects on the ecological balance in the area. Panning for gold, which is being conducted intensively along the banks of Dawa river, is a significant potential threat to the river and its associated flora and fauna.

Further reading

Boka (1996), Ethiopian Wildlife and Natural History Society Survey Team (1996), Friis (1992), Munoz (1976), Robertson (1994), Smith and Smith (1996), Sorenson *et al.* (1996), Syvertsen (1995b), Torstein (1992), Water Resources Development Authority (1976, 1987), Yigezu (1996).

Lake Chew Bahir

ET067

Admin region Southern Peoples' Region, Oromiya

Coordinates 04°43'N 36°50'E

A1, A3 (A08), A4i, A4iii

Area 112,500 ha Altitude 520 m

Wildlife Reserve

Site description

Lake Chew Bahir is at the end of the Ethiopian section of the Great Rift Valley. It lies across the border of South Omo Zone of Southern Nation, Nationalities and Peoples' Region to the west, and the Borena Zone of Oromiya Region to the east. The southern tip of the lake crosses the border into Kenya. The nearest settlement to the lake, Arbore, is in South Omo Zone, over 130 km south-east of the zonal capital Jinka. The Lake lies in a basin primarily composed of the floodplains of the Gelana Dulei river, itself formed by the confluence of the Segen and Weyto rivers. Chew Bahir basin and the Gelana Dulei and Weyto valleys are flanked on the west by steep, finely dissected, scarps rising to 1,600 m, the result of large-scale faulting. Lake Chew Bahir is subject to substantial changes in area as a result of variations in river discharge. It often dries out, but the lowest part in the north-east is always moist. As there is no outlet, all water entering the lake is lost by evaporation. Over the past century, Chew Bahir has varied from swamp to shallow open water with a maximum depth of 7.5 m and a surface area of up to 2,000 km². The water of Chew Bahir is so highly saline that it cannot be used for either irrigation or domestic purposes. However, to the south-east across the mudflats lie a series of springs: some occur around the base of rock outcrops, but others are isolated on the flats where they support a dense growth of coarse, salt-tolerant sedge. The site supports a range of habitats, including marsh, open water, mudflats, springs, *Acacia-Euphorbia* bushland, mixed broadleaved scrub with *Terminalia* spp., scattered *Acacia* and *Acacia* scrub. There is a sparse vegetation of salt-tolerant plants throughout the basin. Particularly common is the tall coarse grass, *Sporobolus consimilis* and the mat-forming *Sporobolus spicatus*. There are a number of *Cyperus* species which are also highly salt-tolerant. However, where fresh water enters there are rich swampy areas and pools which are said to have tall *Echinochloa* spp., other *Cyperus* spp. and *Nymphaea* spp. The marshes support a high population of amphibians and snails. The Weyto valley has a very open, dry *Acacia* savanna, the main trees being *A. senegal* and *A. polyacantha*, with *A. mellifera* forming dense stands along with spiny capparid species and *Cadaba rotundifolia*. Ground-cover is sparse, comprising a few perennial grasses, some interesting succulents such as *Caralluma* spp., many opportunistic annuals and some geophytes such as *Pancratium tenuifolium* which only appears after heavy rain. The Arbore, Tsemay and Hamer peoples inhabit the Weyto valley and Chew Bahir basin. They are basically pastoralists, but grow some crops opportunistically. Access to the freshwater springs in and beside the lake is disrupted.

Birds

See Box and Table 3 for key species. Estimates of *Phoenicopterus minor* vary between 4,000 in 1975, to 'hundreds of thousands' in 1969. A minimum of 300 (but probably nearer 1,000) *Anastomus lamelligerus* were noted in a small area of marsh. Substantial numbers of Palearctic waders, and presumably ducks, occur seasonally. Other abundant waterbirds include *Sterna nilotica*, and various Afrotropical ducks including *Dendrocygna bicolor* and *D. viduata*. Significant populations of *Porphyrio alleni* (more than 20 in one small area) and *Charadrius pecuarius* occur. The Somali–Masai biome species include *Mirafra poecilosterna*, *Turdoides aylmeri*, *Batis perkeo*, *Nectarinia hunteri*, *Plocepasser donaldsoni*, *Lamprotornis shelleyi*, *Speculipastor bicolor*, *Merops revoilii*, *Passer gongonensis* and *Lonchura griseicapilla*.

Key species

A1	<i>Phoenicopterus minor</i>		
A3 (A08)	Somali–Masai biome species: 35 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.		
A4i		Breeding (pairs)	Non-breeding
	<i>Anastomus lamelligerus</i>	—	1,000+
	<i>Phoenicopterus minor</i>	—	20,000+
A4iii	The site holds in excess of 20,000 waterbirds on a regular basis.		

Other threatened/endemic wildlife

The plains around the lake support populations of many mammal species including *Equus grevyi* (EN). The Chew Bahir basin is an important type-locality for a number of species endemic to the arid and semi-arid conditions of the Ethiopian–Kenyan border area.

Conservation issues

The lake is situated within the Chew Bahir Wildlife Reserve, which covers an area of c.273,000 ha, although (as far as is known) no conservation activities have ever been implemented in the reserve. It is even unclear whether the reserve has been formally designated as such. The Weyto valley and the lower Omo have been important for big-game hunting.

Further reading

Birchall *et al.* (1975), Bolton (1970), Coppock (1994), Hughes and Hughes (1992), Talling and Wood (1988), Tyler (1975).

Bogol Manyo–Dolo

ET068

Admin region Somali

Coordinates 04°31'N 41°32'E

A1, A2 (113), A3 (A08)

Area Undefined Altitude 350–450 m

Unprotected

Site description

Bogol Manyo is in the Genale river basin in El Kere Zone, and close to the junction of the Ethiopian, Kenyan and Somalia borders. The area is crossed by the track from Negele to Dolo on the border with Somalia. The site covers the area from c.30 km north-west of Bogol Manyo (towards Filtu), to Dolo, south-east of Bogol Manyo on the border with Somalia. The area is dry, with an annual rainfall of around 200 mm, most of which falls in April or May. The underlying rock and outcrops are limestone. Small trees (3–4 m high) and shrubs cover much of the area, but for most of the year the plants are leafless and the ground has little cover. This apparent bareness and uniformity hides a considerable diversity in the flora, much of which is unique to this area of Ethiopia, Somalia and Kenya. For example, one of the most important groups in the area is *Commiphora*, the diverse group of trees that produces gums and resins such as kербie or myrrh. In many species the resin is heavily scented and burnt as incense, although in some it is poisonous and used on arrows or to remove external parasites, particularly ticks, from cattle. The Somali peoples that inhabit the area are pastoralists, depending on camels, cattle, sheep and goats. The other major economic activity in the area is the collection of gums and resins from the various *Commiphora* and *Boswellia* species.

Birds

See Box and Tables 2 and 3 for key species. The site holds the only known population of *Mirafra degodiensis*. The species was described from birds collected in 1971 at a site 11 km east of Bogol Manyo on the road to Dolo, and small numbers have subsequently been found

15 and 17 km east of Bogol Manyo. *Streptopelia reichenowi* occurs along the Genale river, but is uncommon, and *Sylvietta philippae*, known from only three locations in Ethiopia, is considered rare, having been seen only two or three times at this site. Somali–Masai biome species found at this site include *Ploceus dichrocephalus*, *Merops revoilii*, *Turdoides aylmeri*, *Tmetothylacus tenellus* and *Nectarinia nectarinioides*. *Colius leucocephalus*, *Uraeginthus cyanocephalus* and *Spreo fischeri* are all known from the Dolo area. *Burhinus vermiculatus* is expected to occur in the site along the Genale river.

Key species

A1	<i>Streptopelia reichenowi</i> <i>Mirafra degodiensis</i>	<i>Sylvietta philippae</i>
A2 (113)	Jubba and Shabeelle valleys EBA: All three of the species of this EBA that occur in Ethiopia have been recorded at this site; see Table 2.	
A3 (A08)	Somali–Masai biome species: 36 of the 98 species of this biome known from Ethiopia have been recorded at this site; see Table 3.	

Other threatened/endemic wildlife

The lower Genale river basin supports a diverse endemic flora.

Conservation issues

The extreme dryness and absence of permanent water has probably prevented the expansion of settlements in the area. However, pastoralists and their herds use it extensively, which, in combination with the growing demand for fuelwood and particularly charcoal from the urban centres (as well as the refugee camps) is expected to have a negative effect on the ecological balance of the whole area. *Acacia* is preferred for charcoal and could be cut out, and the trees supplying gums and resins could be over-exploited. It is likely that this fragile ecosystem would not be able to recover if it was once destroyed. There is currently no conservation action being taken in the area. Further fieldwork is needed to determine the range and status of the poorly known *Mirafra degodiensis* and other threatened bird species.

Further reading

Ash (1982), Ash and Gullick (1990b), Erard (1975a), Vollesen (1989), Webb and Smith (1996).

Lake Turkana and Omo delta

Admin region Southern Peoples' Region
Coordinates 04°28'N 36°15'E
Area Undefined Altitude 375 m

ET069

A4i, A4iii
Unprotected

Site description

Lake Turkana lies across the Ethiopia–Kenya border in South Omo Zone. Omo Rate is the closest settlement, 70 km north of Lake Turkana. Omo Rate is the lowest ferry-crossing on the Omo river and comprises a police post and a village of the Geleb people. The lake takes its name from the Turkana people who live round it (although it has previously been called Rudolph). The main part of the lake is in Kenya. Only the northern arc with about 52 km of shoreline is within Ethiopia. There is no direct access by road to the western shores of Lake Turkana from

the Ethiopian side. The maximum depth of the lake is c.114 m. The water-level in the lake is largely determined by the rainfall in south-west Ethiopia. The main source of water is thus the Omo river that accounts for 98% of the riverine inflow. Before reaching the lake, the Omo river forms a wide delta where much of the silt load is deposited. Very little is known about the vegetation and flora on the Ethiopian side of the lake—the trees and shrubs have not been documented. The Omo delta could be expected to support riverine forest or woodland. The lake is said to have extensive reedbeds; whether *Typha* spp. or sedges and rushes or both is not known, but *Cyperus papyrus* is apparently absent from the lake. South Omo is one of the most culturally diverse regions of Ethiopia. The people of the area are hunter-gatherers, fishermen and pastoralists. An attempt to establish a mechanized farm for growing cotton on the Omo flood-plain has been abandoned. Some crops are grown on the levees beside the river upstream of the lake.

Birds

See Box for key species. Lake Turkana is clearly important for birds, with over 350 species recorded from the Kenyan side. However, the Ethiopian portion is poorly known: 64 species were recorded during surveys in February 1996, including two *Circus macrourus*. Other species of note include: 750 *Sterna albifrons/saundersi*, *S. caspia* (common) and 300–800 *Glareola pratincola*.

Key species

A4i	Breeding (pairs)	Non-breeding
<i>Rynchops flavirostris</i>	—	1,000+
A4iii	The site is estimated to hold a minimum of 20,000 waterbirds on a regular basis.	

Other threatened/endemic wildlife

The lake supports 48 fish species, of which 10 are endemic and eight have restricted distributions.

Conservation issues

Omo Rate is associated with an abandoned cotton farm that was established on 1,350 ha of land. If communications with the lower Omo river are improved, attempts may be made to re-start this farm. Large-scale cotton farms make use of large quantities of chemicals, particularly pesticides and fertilizers. The effects on the water in the Omo delta and upper section of Lake Turkana would need to be carefully monitored. The pastoralist groups in the lower Omo valley and around Lake Turkana keep large numbers of cattle, and overgrazing is a potential threat for the area. Also, as a result of disturbances in Somalia, Somali people and their animals have spread along the border area with Kenya where they have come into conflict for resources with the local peoples. On the Kenyan side of the lake there are important archaeological sites where early hominid fossils have been found, and there is some conservation activity. Important fossil deposits in the lower Omo valley also hold remains of mankind's earliest ancestors dating back over two million years, but it appears that little is being done to conserve these sites.

Further reading

Hughes and Hughes (1992).

BIBLIOGRAPHY

- ANON. (undated) *Preliminary study for the proposed Institute of Animal Sciences. Vol. 3: Site demarcation and land use plan*. Addis Ababa. (Unpubl. report.)
- ASH, J. S. (1976) Birds at Omo National Park, 10–17 August 1976. (Unpubl. report.)
- ASH, J. S. (1977) First known breeding of the Ruddy Shelduck *Tadorna ferruginea* south of the Sahara. *Bull. Brit. Orn. Club* 97: 56–59.
- ASH, J. S. (1978) The undescribed female of Harwood's Francolin (*Francolinus harwoodi*) and other observations on the species. *Bull. Brit. Orn. Club* 98: 1–15.
- ASH, J. S. (1979) A new species of Serin from Ethiopia. *Ibis* 121: 1–7.
- ASH, J. S. (1982) The Somali Short-billed Crombec *Sylvietta philippae* in Somalia and Ethiopia. *Bull. Brit. Orn. Club* 102: 89–92.
- ASH, J. S. (1992) Northern White-tailed Bush Lark *Mirafra albicauda*, Singing Bush Lark *M. cantillans* and Friedmann's Bush Lark, *M. pulpa* in Ethiopia. *Bull. Brit. Orn. Club* 112: 247–250.
- ASH, J. S. AND GULLICK, T. M. (1989) The present situation regarding the endemic breeding birds of Ethiopia. *Scopus* 13: 90–96.
- ASH, J. S. AND GULLICK, T. M. (1990a) *Serinus flavigula* rediscovered. *Bull. Brit. Orn. Club* 110: 81–83.
- ASH, J. S. AND GULLICK, T. M. (1990b) Field observations of the Degodi Lark *Mirafra degodiensis*. *Bull. Brit. Orn. Club* 110: 90–93.
- ASH, J. S. AND OLSON, S. L. (1985) A second specimen of *Mirafra (Heteromirafra) sidamoensis* Erard. *Bull. Brit. Orn. Club* 105: 141–143.
- ATKINS, J. D. (1992) A new location for the Ankober Serin *Serinus ankoberensis* near Debre Sina Ethiopia. *Scopus* 16: 90–96.
- ATKINS, J. D. (1996a) Birds in Mago National Park, 29 July–3 August 1996. (Unpubl. report.)
- ATKINS, J. D. (1996b) The birds of Entoto Natural Park: a list of recorded and possible species. (Unpubl. report.)
- ATKINS, J. D. AND EDWARDS, S. (1995) The Jemma valley. (Unpubl. report.)
- ATKINS, J. D. AND HARVEY, W. G. (1994) Further sightings of an unnamed cliff swallow *Hirundo* sp. in Ethiopia. *Scopus* 18: 52–54.

- ATKINS, J. D. AND HARVEY, W. G. (1996) A new site for, and observations on *Serinus flavigula* in Ethiopia, with comments on its taxonomic status. *Bull. Brit. Orn. Club* 116: 52–58.
- ATKINSON, P., ROBERTSON, P., YILMA DELLELEGN, MENGISTU WONDEFRAH AND ATKINS, J. (1996) The recent rediscovery of White-winged Flufftails in Ethiopia. *Bull. Afr. Bird Club* 3: 34–36.
- BALCHA, B., ADEFRIS, T., KEBEDE, E. AND ABUNIE, L. (1984) *Proposal for the delimitation of a Biosphere Reserve in the northern Ethiopian rift*. Report for the Ethiopian Science and Technology Commission, Addis Ababa.
- BELAY, A., HUMBER, D. AND KEBEDE, E. (1986) The explosion crater lakes of Debrezeit. *Walia* 9: 11–15.
- BIRCHALL, C. J., KINGHAM, T. J., MAKIN, M. J., TAMMENE TEFFERA AND WADDEMS, A. E. (1975) *Development prospects in the southern Rift Valley, Ethiopia*. UK: Land Resources Division, Ministry of Overseas Development.
- BLANCK, H. AND ENGLUND, P. (1995) *Entoto Natural Park*. Swedish University of Agricultural Sciences International Rural Development Center.
- BOKA, A. (1996) Forms of community participation in pastoral areas with particular emphasis on Boran society. Pp. 9–13 In: Ministry of Agriculture. *Conference on Pastoralism in Ethiopia*, 4–6 February 1993. Addis Ababa.
- BOLTON, M. (1970) Rift Valley ecological survey report, 3: Lake Stephanie. In: M. Bolton. *WLCO Reports*, 1.
- BORGHESIO, L. (1997a) Field observations on Prince Ruspoli's Turaco *Tauraco ruspolii*. *Scopus* 19: 83–91.
- BORGHESIO, L. (1997b) Observations on the ecology of *Tauraco ruspolii* and *T. leucotis* in southern Ethiopia. *Bull. Brit. Orn. Club* 117: 11–18.
- BROOK LEMMA (1994) Changes in limnological behaviour of a tropical African explosion crater lake: Lake Hora-Kilole, Ethiopia. *Limnologia* 24: 57–70.
- BROWN, L. H. AND URBAN, E. K. (1970) Bird and mammal observations from the forests of southwest Ethiopia. *Walia* 2.
- CATLIN, D. ET AL. (1973) The caves of Ethiopia: the 1972 British speleological expedition to Ethiopia. *Trans. Cave Research Group of Britain* 15: 107–168.
- CHAFFEY, D. R. (1978) *Southwest Ethiopia forest inventory project: an inventory of Tiro forest*. UK: Land Resources Development Centre, Ministry of Overseas Development (Project Report 30).
- CHAFFEY, D. R. (1979) *Southwest Ethiopia forest inventory project: a reconnaissance inventory of forests in southwest Ethiopia*. UK: Land Resources Development Centre, Ministry of Overseas Development (Project Report 31).
- CHEESMAN, R. E. AND SCLATER, W. L. (1935) On a collection of birds from north-western Abyssinia. *Ibis* 13: 151–191.
- CLARK, T. A. AND GREENHIGH, W. H. (1952) *Reconnaissance report on the water resources of the Blue Nile basin in Ethiopia*. Washington, D.C.: Bureau of Reclamation, US Department of the Interior.
- CLOUET, M. AND BARRAU, C. (1993) L'aigle royal *Aquila chrysaetos* dans le massif du Balé (Éthiopie). *Alauda* 61: 200–201.
- CLOUET, M., BARRAU, C. AND GOAR, J.-L. (1995) Le peuplement d'oiseaux de l'étage Afro-Alpin du Massif du Balé (Ethiopie). *Alauda* 63: 281–290.
- COLLAR, N. J. AND STUART, S. N. (1985) *Threatened birds of Africa and related islands: the ICBP/IUCN Red Data Book*. Cambridge, UK: International Council for Bird Preservation and International Union for Conservation of Nature and Natural Resources.
- COLLAR, N. J., CROSBY, M. J. AND STATTERSFIELD, A. J. (1994) *Birds to watch 2: the world list of threatened birds*. Cambridge, UK: BirdLife International (BirdLife Conservation Series 4).
- COPPOCK, D. L., ED. (1994) *The Borana plateau of southern Ethiopia: synthesis of pastoral research, development and change*. Addis Ababa: ILCA.
- COSSINS, N. J. (undated) A study of people and their cattle in the Shire lowlands. Addis Ababa: ILCA. (Unpubl. report.)
- DELLELEGN, Y. (1989) Birds of the Yangudi–Rassa National Park and surrounding wildlife reserves. *Walia* 12: 35–41.
- DELLELEGN, Y. (1990) Survey of the birds of Yabello Wildlife Sanctuary. Addis Ababa: Ethiopian Wildlife Conservation Organization. (Unpubl.)
- DELLELEGN, Y. (1991) Prince Ruspoli's Turaco. *Walia* 13: 29–35.
- DEMEKE, Y. (1996) The birds of Mago Park. *Walia* 17: 37–44.
- DEMEL, T. (1996) Seed ecology and regeneration in dry Afromontane forests of Ethiopia. Doctoral thesis, Umeå.
- DEMISSEW, S. (1988) The floristic composition of the Menagesha State Forest and the need to conserve such forests in Ethiopia. *Mountain Res. and Dev.* 8 (2–3).
- DIKSEN, L. (1995) A preliminary list of birds of Hugumburda State Forest. (Unpubl. report.)
- DIKSEN, L. (1996) A preliminary list of species of Dese'a State Forest, and list of birds seen in the highlands directly West of Dese'a. (Unpubl.)
- DODMAN, T. AND TAYLOR, V. (1995) *African Waterfowl Census 1995*. Slimbridge, UK: International Waterfowl Research Bureau.
- DORST, J. AND ROUX, F. (1972) An ecological sketch of the avifauna of the Bale mountains. *L'Oiseau et RFO* 42: 203–240.
- DOWSETT-LEMAIRE, F. AND DOWSETT, R. J. (1993) Bird checklist: Ethiopia. *Tauraco Research Rep.* 5: 118–125.
- DRAKE, E. (undated) *Simyen: the roof of Africa*. Addis Ababa: Ethiopian Tourism Commission.
- DUCKWORTH, F. W. (1974a) Gambella 1973: a wildlife report. *Walia* 5: 9–11.
- DUCKWORTH, F. W. (1974b) The Whale-headed Stork in Ethiopia. *Bull. Brit. Orn. Club* 94: 3–4.
- DUCKWORTH, J. W., EVANS, M. I., SAFFORD, R. J., TELFER, M. G., TIMMINS, R. J. AND ZEWDIE, C. (1992) *A survey of Nechisar National Park, Ethiopia*. Cambridge, UK: International Council for Bird Preservation (Study Rep. 50).
- DUNBAR, R. P. (1974) Mammals and birds of the Simien Mountains National Park. *Walia* 5: 4–5.
- DUNBAR, R. AND DUNBAR, P. (1974) Mammals and birds of the Simien Mountains National Park. *Walia* 5: 4–5.
- EDWARDS, S. (1996) The case for including Mt Bwahit in the conservation programme for Simen Mountains National Park. *SINET: Ethiop. J. Sci.* 19(1): 149–156.
- ENAWGAW, C. (1996) Distribution, abundance and age structure of elephants in Omo National Park, Ethiopia. *Walia* 17: 17–26.
- ENEL CIE/TO-ITALY (1987) *Aba-Samuel Rehabilitation Study*. Addis Ababa, Ethiopia: EELPA.
- ERARD, C. (1974) Taxonomie des serins à gorge jaune d'Éthiopie. *L'Oiseau et RFO* 44: 308–323.
- ERARD, C. (1975a) Une nouvelle alouette du sud de l'Éthiopie. *Alauda* 43: 115–124.
- ERARD, C. (1975b) Variation géographique de *Mirafraga gilletti* Sharpe, description d'une espèce jumelle. *Oiseau et RFO* 45: 293–312.
- ERICKSON, W. (1982) Bird and mammal observations from southern and western Ethiopia. *Walia* 8: 37–42.
- ETHIOPIAN TOURISM COMMISSION (undated a) Northern lakes of Ethiopia's Rift Valley. (Unpubl. pamphlet.)
- ETHIOPIAN TOURISM COMMISSION (undated b) Omo: unique wilderness. (Unpubl. pamphlet.)
- ETHIOPIAN WILDLIFE AND NATURAL HISTORY SOCIETY (1996) *Important Bird Areas of Ethiopia: a first inventory*. Addis Ababa: Ethiopian Wildlife and Natural History Society.
- ETHIOPIAN WILDLIFE AND NATURAL HISTORY SOCIETY SURVEY TEAM (1995) List of birds at Jimma Airport [and Koffe swamp], 13–14 December 1995. (Unpubl. report.)
- ETHIOPIAN WILDLIFE AND NATURAL HISTORY SOCIETY SURVEY TEAM (1996) Bird species recorded from the Liben plains, 29–30 June 1996. (Unpubl. report.)
- ETHIOPIAN WILDLIFE AND NATURAL HISTORY SOCIETY SURVEY TEAM (1996) Bird species recorded from Mankubsa–Welenso National Forest Priority Area, 27–28 June 1996. (Unpubl. report.)
- FAO (1984a) Vegetation and their natural regions and their significance for land-use planning based on the work of Sture E. Marklund and Victor A. O. Odenyo. Assistance to Land-use Planning in Ethiopia: AG:DP/ETH/78/003. Techn. Rep. 4.
- FAO (1984b) Agroclimatic resources inventory for land-use planning based on the work of Wolfgang Goebel and Victor A. O. Odenyo. Assistance to land-use Planning in Ethiopia: AG:DP/ETH/78/003. Techn. Rep. 2 (1–3).
- FARM AFRICA (undated) The East Langano Development and Conservation Project and Ecotourism Camp. (Unpubl. executive summary.)
- FARM AFRICA (1996) *FARM Africa Shewa joint forest management pilot project*. Addis Ababa: FARM Africa.
- FETWI, F., ABEBE, F., PARIS, S. AND ESTIFANOS, T. (1986) *Exploratory assessment of resources and landuse of Omo and Mago National Parks and adjacent areas*. Addis Ababa: Ministry of Agriculture. NRCDMD, Landuse Planning and Regulatory Dept.
- FOREST INVENTORY, DEMARCATION AND MANAGEMENT PLAN DIVISION (1991) *Management plan for Menagesha Suba State Forest*. Addis Ababa: State Forest Conservation and Development Department.
- FOREST MANAGEMENT PLANNING DIVISION (1989). Management Plan for Tiro Botor–Becho State Forest Project for the period of 1989/90–1993/94 (1982–1986 E.C.). Addis Ababa: SFCDD / NRCDMD.
- FRENCH MINISTRY OF FOREIGN AFFAIRS AND NATIONAL WATER RESOURCES COMMISSION (1973) Wabeshebele Survey, 5: the soils of the Wabeshebele Basin Management and Utilisation with a soil map at 1:1,000,000. France: ORSTOM.
- FRENCH MINISTRY OF FOREIGN AFFAIRS AND NATIONAL WATER RESOURCES COMMISSION (1974) Wabeshebele Survey, 6: botany (wildlife). France: ORSTOM.
- FRIIS, I. (1992) Forests and forest trees of north-east tropical Africa. *Kew Bull. Additional Ser.* 15: 1–396.

- GIBSON, I. L. (1967) Preliminary account of the volcanic geology of Fantale, Shoa. *Bull. Geophysical Observatory Addis Ababa* 10: 59–67.
- GILBERT, E. F. (1970) Mount Wehecha: a botanical commentary. *Walia* 2: 3–12.
- GOTTELLI, D. AND SILLERO, C. Z. (1992) The Ethiopian Wolf—an endangered endemic canid. *Oryx* 26: 205–214.
- GUNTHER, M. (1993) Observations of the Ankober Serin *Serinus ankoberensis* at the site of Gosh Meda. (Unpubl. report.)
- HARRIES, P. S. (1989) An analysis of the pastoral resource and development opportunities for Menagesha and, Haikoch and Butajira field document, UNDP/FAO Project ETH/87/006.
- HARZA ENGINEERING COMPANY (1966) *Finchaa Project feasibility report* vol. 2 appendices. Addis Ababa: Water Resources Dept., Ministry of Public Works and Communications.
- HAUGEN, T. (1992) Woody vegetation of Borana, south Ethiopia: a study on the main vegetation types of the area. *Ethiop. J. Sci.* 15(2): 117.
- HEDBERG, O. (1957) Afroalpine vascular plants. *Symb. Bot. Upsal.* 15: 1–411.
- HILL, G. G., HILL, M., SANTI, G. AND ROBERTSON, L. (1970) Dubti plantation check-list of birds. *Walia* 2: 41–65.
- HILLMAN, J. C. (1985) *Bale Mountains National Park management plan*. Addis Ababa, Ethiopia: EWCO.
- HILLMAN, J. C. (1988) *Abijatta–Shalla Lakes National Park: report on status and proposals*. Addis Ababa, Ethiopia: EWCO.
- HILLMAN, J. C. (1993) *Ethiopia: compendium of wildlife conservation information, 1-2: information on wildlife conservation areas*. New York/Addis Ababa: New York Zoological Society–Wildlife Conservation Society International/Ethiopian Wildlife Conservation Organization.
- HUGHES, R. H. AND HUGHES, J. S. (1992) *A directory of African wetlands*. Gland, Switzerland and Cambridge, UK / Nairobi, Kenya / Cambridge, UK: IUCN/UNEP/WCMC.
- HUNDESSA, T. (1991) Survival status review of the Ethiopian Bushcrow (*Zavattariornis stresemanni* Moltoni 1938) in the Borana area, Ethiopia. *Walia* 13.
- HURNI, H. (1986) *Management plan: Simen Mountains National Park and surrounding rural area*. Addis Ababa: UNESCO World Heritage Commission and EWCO.
- HYLANDER, K. AND HYLANDER, E. (1995) *Mount Zuquala, an upland forest of Ethiopia: floristic inventory and analysis of the state of conservation*. In: Växtekologi, Botaniska institutionen Stockholms Universitet, 1995: 27 pp + 5 appendices.
- IMPERIAL ETHIOPIAN GOVERNMENT (1973) *Shire lowlands development project*. Addis Ababa: Imperial Ethiopian Government.
- IMPERIAL ETHIOPIAN GOVERNMENT NATURAL RESOURCES COMMISSION (1974) *Wabi Shebelle survey volume 6. Botany, Annex: Wildlife*. Paris, France: ORSTOM.
- JACOBS, M. J. AND SCHLOEDER, C. A. (1993) *The Awash National Park Management Plan, 1993–1997*. New York/Addis Ababa: New York Zoological Society/Wildlife Conservation Society International/Ethiopian Wildlife Conservation Organization.
- JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) (1977) Feasibility report on power development at Lake Tana Region, Ethiopia. (Unpubl. report.)
- KAJI, M. (1979) *Vegetation and flora of Omo National Park*. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- KEBEDE, E. AND HUMBER, D. (1989) Lakes of the Southern Ethiopian Rift, 2: Lake Awassa. *Walia* 12: 3–9.
- KIDAN, W. G. G. (1996) The status of mountain nyala (*Tragelaphus buxtoni*) in Bale Mountains National Park 1986–1994. *Walia* 17: 27–38.
- KLOTZLI, F. (1975) Simien: a recent review of its problems. *Walia* 6: 18–19.
- LARSSON, M. (1998) *Agricultural productivity and land degradation: a study of two areas in the highlands of Ethiopia*. Uppsala: SLU (Minor Field Stud. 36).
- LEWIS, J. G. AND WILSON, R. T. (1977) The plight of Swayne's hartebeest. *Oryx* 13: 490–494.
- LEWIS, J. G. AND WILSON, R. T. (1979) The ecology of Swayne's hartebeest. *Biol. Conserv.* 15: 1–12.
- LILYESTROM, W. E. (1974) Birds of the Simien highlands. *Walia* 5: 2–3.
- MADARASZ, D. J. VON (1912) Drei neue abessinische vogel. *Orn. Monatsberichte* 20: 45–46.
- MADGE, S. C. AND REDMAN, N. J. (1989) The existence of a form of Cliff Swallow *Hirundo* sp. in Ethiopia. *Scopus* 13: 126–129.
- MAKIN, M. J. ET AL. (1976) *Prospects for irrigation development around Lake Zeway, Ethiopia. Land Resource Study 26. Management Plan*. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- MALCOLM, J. M. (1982) Wintering waterfowl in the Bale mountains, Ethiopia. *Scopus* 6: 71–72.
- MARINO, J., LAURENSEN, K., FIKADU, S., ZELEALEM, T., GOBEZE, W., DERBIE, D., KASAW, A., MINDA, T. AND SILLERO-ZUBIRI, C. (1999) Status and distribution of Ethiopian wolf populations in South Wollo, North Wollo and Simen highlands. (Unpubl. report.)
- MASSELLI-NOVELLI, R. (1986) Status and habitat of Great Snipe in Ethiopia and its movements in Africa. Pp. 12–15 in: *Third European Woodcock and Snipe Workshop proceedings*.
- MASSELLI-NOVELLI, R. (1988) Segnalazione di schiribilla alibianche *Sarothrura ayresi* in Etiopia. *Riv. ital. Orn.* 58: 40–42.
- MENGISTU, W. AND TADESSE, W. G. (1998) White-winged Flufftails in marshes of the Central Plateau of Shoa: report on the 1998 Study in Ethiopia. *EWNHS Newsletter* October–December 1998: 4–6.
- MESSANA, M. J. H. AND BEREKET, N. (1994) The Senkele Swayne's hartebeest sanctuary. (Unpubl. report.)
- MIEHE, S. AND MIEHE, G. (1994) *Ericaceous forests and heathlands in the Bale mountains of southern Ethiopia: ecology and man's impact*. Hamburg: Stiftung walderhaltung in Afrika.
- MINISTRY OF AGRICULTURE (1980) The last forests of Ethiopia. Addis Ababa: Forest and Wildlife Conservation and Development Authority. (Internal report.)
- MINISTRY OF NATURAL RESOURCES DEVELOPMENT (MoNRDEP), United Nations Capital Development Fund (UNCDF) and FARM Africa (1995) Proceedings: workshop on the Simen Mountains National Park management, Gondar, February 15–17, 1995. Addis Ababa: UNCDF.
- MOHR, P. A. (1961) The geology, structure and origin of the Bishoftu explosion craters: Ethiopia. *Bull. Geophys. Obs., Addis Ababa University* 2.
- MOLLA, M. (1994) Traditional environmental knowledge and resource management among the Agaw of Gojjam. Unpublished M.Sc. Thesis, Addis Ababa University.
- MOREAU, R. E. (1958) Some aspects of the Musophagidae. *Ibis* 100: 67–112.
- MUNOZ, C. A. (1976) *Summary report on Dawa basin study*. Addis Ababa: Ethiopian Water Resources Authority, Provisional Military Government of Ethiopia.
- NATIONAL WATER RESOURCES COMMISSION (1987) How to resettle people who will be displaced from Boyo swamp. Addis Ababa: National Water Resources Commission.
- NETSEREAB, N., ENAWGAW, C. AND GRAHAM, A. (1996) *Trends in large herbivore numbers of Omo and Mago National Parks*. Addis Ababa: Southern Nations, Nationalities and Peoples Regional Government, Bureau of Agriculture, and EWCO, Ministry of Agriculture.
- NIEVERGELT, B. (1981) *Ibexes in an African environment*. Berlin: Springer-Verlag.
- OLSON, C. (1976) Summary of field observations of birds from Begemdir and Simien province. *Walia* 7: 17–24.
- ONO, Y. AND DOI, T. (1983) Socio-ecological studies on Ethiopian mammals. Japan: Kyushu University.
- OSBORNE, J. (1981) The south west forest area: a study and review of available information, April 1991. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- OSBORNE, J. (1990) Report to African Wildlife Foundation. Babile (Harrar) Elephant Sanctuary. Addis Ababa: EWCO.
- PANKHURST, R. (1996) A chapter in the history of Ethiopian elephants: the Ptolemaic century (305–284 BC), and its Axumite aftermath (to 525 AD). *Walia* 17: 11–16.
- PETTERSSON, O. (1986) Project document for Tiro Boter-Becho pilot area. Proposed management and organization structure for an integrated pilot project. (Unpubl. report.)
- ROBERTSON, I. S. (1994) Ethiopian endemic birds with restricted ranges. (Unpubl. report.)
- ROBERTSON, I. S. (1995) First field observations on the Sidamo Lark *Heteromirafra sidamoensis*. *Bull. Brit. Orn. Club* 115: 241–243.
- ROBERTSON, P. A., DELLELEYN, Y., DEJENE, S., SHIMELIS, A., MARIAM, T. AND ALEMAYAHU, M. (in prep.) Harwood's Francolin (*Francolinus harwoodi*): recent observations on its status, habitat requirements, behaviour and threats. *Bird Cons. International* 7: 275–282.
- ROBSON, G. E. (1977) The caves of Sof Omar. *Geographical J.* 133(3).
- RUSS, G. R. AND WOLDE, M. K. (1979) Reports on Ethiopian forests. Addis Ababa: Provisional Military Government of Ethiopia, Forestry and Wildlife Development Authority.
- SAFFORD, R. J. (1993) A second record of the Northern White-tailed Bush Lark *Mirafra albicauda* in Ethiopia. *Scopus* 16: 99–101.
- SAFFORD, R. J., ASH, J. S., DUCKWORTH, J. W., TELFER, M. G. AND ZEWDIE, C. (1994) A new species of nightjar from Ethiopia. *Ibis* 137: 301–307.
- SAFFORD, R. J., DUCKWORTH, J. W., EVANS, M. I., TELFER, M. G., TIMMINS, R. J. AND ZEWDIE, C. (1993) The birds of Nechisar National Park. *Scopus* 16: 61–80.
- SHIMELIS, A. AND DEJENE, S. (1998) Diversity and abundance of birds at Mago National Park. (Unpubl. report.)
- SIME, K. (1993) Elephant field study report. Addis Ababa: Ethiopian Elephant Conservation and Development Programme, EWCO. (Unpubl. report.)
- SMITH, P. W. AND SMITH, S. A. (1996) Trip to Ethiopia, 20 May–9 June 1996. (Unpubl. report.)

- SORENSEN, U., KRABBE, E., BECH, J. AND HALBERG, K. (1996) Notes on birds recorded in Ethiopia, January–February 1996. (Unpubl. report.)
- STEPHENSON, J. G. (1976) *Inspection notes on the Awash National Park*. Addis Ababa: EWCO.
- STEPHENSON, J. G. (1978) The conservation of wildlife in the Awash–Danakil Rift Valley. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- STEPHENSON, J. G. AND MIZUNO, A. (1978) Recommendations on the conservation of wildlife in the Omo–Tama–Mago Rift Valley of Ethiopia. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- SUTCLIFFE, J. P. ET AL. (1988) A rural land use plan of the Hosana (Shewa) area, June 1988. Addis Ababa: Peoples Democratic Republic of Ethiopia, Ministry of Agriculture, United Nations Development Program, Food and Agricultural Organization.
- SYVERTSEN, P. O. (1990) Annotated checklist of birds, mammals and reptiles in Borana. Report to Ethiopian Wildlife Conservation Organization. (Unpubl. report.)
- SYVERTSEN, P. O. (1991) Annotated checklist of birds, mammals and reptiles recorded in Borana 1990. (Unpubl. report.)
- SYVERTSEN, P. O. (1995a) Wintering waterbirds on Ethiopian Rift Valley lakes. *Walia* 16: 3–13.
- SYVERTSEN, P. O. (1995b) Notes on some selected bird species in Borana, south Ethiopia. (Unpubl. report.)
- SYVERTSEN, P. O. (1996) Waterbird surveys in Ethiopia in January 1996. Dept. of Biology, University of Oslo, Norway. (Unpubl. report.)
- SYVERTSEN, P. O. AND DELLELEGN, Y. (1991) The status of some bird species endemic to south Ethiopia. *Scopus* 15: 30–34.
- TADESSE, M. (1992) A survey of the evergreen forests of Ethiopia. Pp. 1–18 in: *Botany 2000, East and Central Africa: the status of some plant resources in parts of Tropical Africa*. NAPRECA Monograph 2.
- TADESSE, W. G. (1998) Diversity of woody plants and avifauna in a dry Afromontane forest on the central plateau of Ethiopia. (M.Sc. Thesis.)
- TADESSE, W., DEMEL, T. AND EDWARDS, S. (1999) Avian species diversity in a dry Afromontane forest on the central plateau of Ethiopia: indicators of biological richness and priority areas for conservation. In: *Proc. 9th Annual Conference of Biological Society of Ethiopia*. Addis Ababa: Biological Society of Ethiopia.
- TALLING, J. J. AND WOOD, R. B. (1988) Chemical and algal relationship in a salinity series of Ethiopian inland waters. *Hydrobiologia* 158: 29–67.
- TAMRAT, B. (1993) Vegetation ecology of remnant Afromontane forests on central plateau of Shewa. *Acta Phytogeogr. Sue.* 79: 1–59.
- TAMRAT, B. (1994) Studies on remnant Afromontane forests on central plateau of Shewa, Ethiopia: Uppsala. (Ph.D. Thesis.)
- TATE AND LYLE TECHNICAL SERVICES LTD. (1982) *Finchaa Sugar Project studies phase II* vol. 2. Addis Ababa: Ethiopian Sugar Corporation.
- TAYLOR, P. B. (1996) The White-winged Flufftail and its wetland habitats: report on a study visit in Ethiopia, 11–27 August 1996. (Unpubl. report.)
- TAYLOR, P. B. (1997) White-winged Flufftails and wetlands: results of fieldwork in Ethiopia from 29 July to 8 August 1997. (Unpubl. report.)
- TEDLA, S. (1995) Protected areas management crisis in Ethiopia. *Walia* 16: 17–30.
- TEFERA, F. (undated) A preliminary survey of avifauna in Lake Zeway. (Unpubl. report.)
- TEFERA, Z. (1994) *Management plan of Omo National Park*. Addis Ababa: Ethiopian Wildlife Conservation Organization.
- TEFERA, Z. (1995) Community resource management of a natural habitat in Menz, north Shewa. Pp. 48–50 in: *Proc. Participatory Wildlife Management Workshop, 16–18 May, 1995*. Addis Ababa: Ministry of Natural Resources Development and Environmental Protection and FARM Africa.
- TEKLU, G. K. (1992) *Management Plan for forests of Tigray*. Addis Ababa: State Forest Conservation and Development Department.
- TESFAYE, K. (1985) Nechisar National Park preliminary report (with particular reference to the distribution of large herbivores and major threats to the Park resources). Ethiopian Wildlife Conservation Organization. (Unpubl.)
- TILAHUN, T., HADJ, B. AND BARRE, B. (1996) From communal grazing to privatised enclosures: a case study of changing land tenure in Jerer valley. Pp. 73–78 in *Full papers from the Conference on Pastoralism in Ethiopia, 4–6 February 1993*.
- TORSTEIN, H. (1992) Woody vegetation of Borana, south Ethiopia: a study on the main vegetation types of the area. *SINET: Ethiop. J. Sci.* 15: 117–130.
- TURTON, D. (1995) The Mursi and the elephant question. Pp. 25–39 in: *Proc. Participatory Wildlife Management Workshop. MNRDEP, 16–18 May 1995*. Addis Ababa: FARM Africa.
- TYLER, S. (1975) Observations of the mammals and birds of the Chow Bahr or Lake Stephanie area. *Walia* 6: 2–3, 7.
- URBAN, E. K. (1967) Possible occurrence of the Whale-headed Stork in Ethiopia. *J. E. Afr. Nat. Hist.* 26: 87–88.
- URBAN, E. K. (1970) Ecology of water birds of four Rift Valley lakes in Ethiopia. Haile Selassie I University, Ethiopia. (Unpubl. report.)
- URBAN, E. K. (1984) Time of egg-laying and numbers of nesting Great White Pelicans at Lake Shalla, Ethiopia, and elsewhere in Africa. *Proc. 5th Pan-Afr. Orn. Congr.* 809–823.
- URBAN, E. K. (1991) Palaeartic and afro-tropical ducks and geese at Gafersa reservoir, Ethiopia, 1964–1970. *Scopus* 14: 92–96.
- US DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION (1964) Land and water resources of the Abbay basin, Ethiopia. Washington, D.C.: Bureau of Reclamation, US Dept. of Interior.
- VITTERY, A. (1983) Movement of Palaeartic raptors in the Ethiopian Rift Valley. *Scopus* 7: 1–9.
- VOLLESEN, K. (1989) Burseraceae. Pp. 442–478 in: I. Hedberg and S. Edwards, eds. *Flora of Ethiopia, 3. Pittosporaceae to Araliaceae*. Addis Ababa and Uppsala.
- WALTERMIRE, R. G. (1973) A National Park in the Bale mountains. *Walia* 6: 20–24.
- WATER RESOURCES DEVELOPMENT AUTHORITY (1987) Preliminary survey of land and water resources: Genale-Dawa–Weyb basin. Interim report. Addis Ababa, Ethiopia.
- WEBB, R. AND SMITH, S. (1996) Degodi Lark *Mirafra degodiensis*, one of Africa's most poorly-known species. *Bull. Afr. Bird Club* 3: 85–86.
- WHITE, F. (1983) The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa. *Nat. Resour. Res. (Paris)* 20: 1–356.
- WIRTU, D., AND MESKEK, S. G. (1992) *Negele forest proposed indicative management plan*. State Forest Conservation and Development Department, Ethiopia.
- WOLDU, Z. AND TADESSE, M. (1990) The status of the vegetation in the lakes region of the Rift Valley of Ethiopia and the possibilities of its recovery. *SINET: Ethiop. J. Sci.* 13: 97–120.
- WOOD, R. B. AND TALLING, J. J. (1988) Chemical and algal relationships in a salinity series of Ethiopian inland waters. *Hydrobiologia* 158: 29–67.
- WOODROOFE, R. AND ASSOCIATES (1990) Initial appraisal report: changes in the level of Lake Beseka and their effect on the adjacent development. Ethiopian Valleys Development Studies Authority. People's Democratic Republic of Ethiopia, Addis Ababa.
- YIGEZU, T. (1996) A case study with particular reference to the Boran pastoralist system in Ethiopia. Pp. 5–8 in: *Conference on pastoralism in Ethiopia, 4–6 February 1993. Full papers*. Addis Ababa: Ministry of Agriculture.
- ZERIHUN, W. AND BACKÄUS, I. (1991) The shrubland vegetation in western Shewa, Ethiopia and its possible recovery. *J. Veg. Sci.* 2: 173–180.