THE WILDLIFE CONSERVATION AREAS OF ETHIOPIA: CURRENT STATUS AND FUTURE PROSPECTS

PROCEEDINGS OF A WORKSHOP

Organized by

Biological Society of Ethiopia

February 14-15, 2002

Faculty of Science,
Addis Ababa University

Edited by
Seyoum Mengistou and Abebe Getahun
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Acknowledgement

The Biological Society of Ethiopia would like to extend its sincere appreciation to the DGIS-WWF Forest Conservation in High Priority Areas Project (EWCO), the Research and Publications Office (Addis Ababa University), the Ethiopian Agricultural Research Organization (EARO) and the Ethiopian Science and Technology Commission for their financial assistance towards the Workshop.
WELCOMING ADDRESS

By Prof. Afework Bekele, President, Biological Society of Ethiopia

Your Excellency Ato Gebremedhin Belay, V/Minister of Agriculture.

Dear BSE members,

Distinguished guests.

Ladies and gentlemen.

The Biological Society of Ethiopia is a professional society of biologists having about 500 members to date. One of the objectives of our Society is to create awareness on development issues in the formal and informal education sectors and amongst the general public. Therefore we believe that it is imperative for a professional society of our kind to contribute its share in the national endeavor towards attaining food security and sustainable use of natural resources.

Therefore, the main theme of this year’s (XIIth) Annual Conference is ‘The Conservation Areas of Ethiopia: Current Status and Future Prospects’.

The major aims of the Conference are:

- To raise the level of awareness among the public in general and the Workshop participant institutions in particular about the current status of Ethiopia’s conservation areas;
- To assess the economic importance of conservation areas and recommend ways of promoting tourist attraction;
- To assess the problems of conservation areas associated with institutional arrangement and eventually suggest some corrective measures;
- To create a forum about the roles played by communities, questions of ownership and use right in the management of conservation areas;
- To review the national policies and legislations pertinent to the management of conservation areas and their resources and discuss about the problems associated with their implementation;
- To suggest directions for new research and conservation programmes; and
- To produce a document that would contribute a great deal towards future endeavors of conservation areas development and management.

During this two-day Conference, more than 35 papers will be presented on various biological disciplines.
During the first day Workshop, case studies of some important animals will be presented to depict the status of conservation of the different conservation areas. Some of the fauna to be dealt with during the Workshop include:

- The Wild Ass,
- Mountain Nyala,
- Swayne's Hartebeest,
- The baboons,
- The Ethiopian Wolf,
- Walia Ibex,
- Threatened avian species, and
- Other wildlife species

Over 300 participants including BSE members, as well as invited guests from various governmental and non-governmental organizations are expected to attend this Conference.

Finally, I would like to extend my sincere appreciation and gratitude to our collaborators in this Workshop: the Ethiopian Wildlife Conservation Organization, the Department of Biology (AAU), and the Institute for Biodiversity Conservation and Research. Our heartfelt thanks also go to the DGIS-WWF Forest Conservation in High Priority Areas Project, Ethiopian Agricultural Research Organization as well as the Ethiopian Science and Technology Commission for their financial assistance towards this Conference. My thanks should also go to H.E. Ato Gebremedhin Belay, V/Minister of Agriculture for his positive attitude and prompt response to our request regardless of apparent time constraints.

I bid all of you welcome on behalf of the Biological Society of Ethiopia and the Organizing Committee of this Workshop and now call upon H.E. Ato Gebremedhin Belay, V/Minister of Agriculture, to give us a keynote address.

Thank you.
Respected members of the Biological Society of Ethiopia,

Invited Guests,

Ladies and gentlemen,

It is indeed a pleasure to have been given this opportunity to make a keynote address at this XIIth Annual Conference of the Biological Society of Ethiopia, which adopted the conservation areas as its main theme under the title "The Conservation Areas of Ethiopia: Current Status and Future Prospects".

It is well known that the diversity of soil, climate and elevation in Ethiopia allows a tremendous diversity in its vegetation ranging from the desert shrubs to the afro-alpine vegetation found on the highest slopes. Eventually, Ethiopia possesses 280 species of terrestrial mammals, 862 bird species, 201 species of reptiles, 63 species of amphibians, 150 species of fish and about 7000 species of vascular plants. Among these, 30 species of mammals, 16 species of birds, 10 species of reptiles, 30 species of amphibians, 4 species of fish and about 700 species of vascular plants are endemic. As a result, the country is considered as one of the centers of endemism. A substantial part of these biological resources of the country are located in the national parks, sanctuaries and other conservation areas.

In addition to the original purposes of landscape conservation and public recreation, many parks have been established to protect endangered species of animals or plants and to promote scientific research. Therefore, conservation areas may be seen as nature reserves, a term which refers to a variety of areas in which rare animals, plants, or whole environments are protected and studied. Many national parks and nature reserves are affected by a conflict between the needs of conservation and utilization.

The conservation of such areas of natural beauty, cultural heritage, or scientific interest is especially problematic in developing countries. The United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), and the Food and Agriculture Organization (FAO) all support and sponsor national parks and nature reserves in developing countries. In addition UNESCO has placed many national parks and nature reserves, in both developed and developing countries, on its World Heritage List of unique environments. The Simien Mountains National Park is a typical example for this.

In Ethiopia, the 1992 Wildlife Policy that is awaiting the Government's approval has the following underlying objectives:

- Conservation of wildlife species:
The proper conservation and sustainable use of the conservation areas would undoubtedly contribute towards the country's economic boost and thereby alleviation of poverty.

In 1994, the World Tourism Organization (WTO) estimated that there were 528.4 million tourist arrivals which generated 321,466 million USD in receipts; it further predicted that by the year 2000 tourism would become the major global economic activity, surpassing even the trade in oil and manufactured goods. For developed and developing countries alike, it has become a major source of foreign exchange earnings, a generator of personal and corporate incomes, a creator of employment, and a contributor to government revenues.

However, the picture in Ethiopia is quite unsatisfactory, especially when compared to some neighbouring countries like Kenya and Tanzania that earn the lion's share of their national income from the tourism industry. To change this picture would, of course, require a concerted effort, and awareness in the different social sectors alike.

Despite its huge potential of biological diversity, Ethiopia yet remains to be one of the world's poorest and least developed nations. Some of the main drawbacks and constraints hampering the conservation efforts of the country's conservation areas are listed below:

- Only two of the Country's protected areas are legally gazetted.
- Human encroachment is affecting the national parks in different ways:
- Habitat clearance for agriculture is destroying a large portion of conservation areas.
- Overgrazing by livestock is leading to severe environmental degradation in many areas.
- Deforestation for firewood collection and commercial logging.
- Damage caused by forest fire due to several causes.
- Illegal honeybee farming, for example, one study revealed that an estimated 4,000 beehives were kept illegally in the Mago National Park.
• Genetic erosion through hybridization of wildlife with related domestic species. The Ethiopian Wolf, for instance, is facing this threat from domestic dogs.

• Lack of research facilities

• The ecologically detrimental effects of some investment activities

In this general context, professional associations like the Biological Society of Ethiopia could play a pivotal role in the national effort to improve the situation. To this end, the initiative that the Biological Society of Ethiopia has taken to organize such a forum should be appreciated. I do hope that some valuable recommendations will come out of this Workshop.

Finally, by wishing you a successful deliberation, it is a pleasure to declare the XIIth Annual Conference of the Biological Society of Ethiopia officially open.

Thank you.
THE STATUS OF GLOBALLY THREATENED RESIDENT BIRDS OF ETHIOPIA

Anteneh Shimelis and Yilma Dellelegn*

ABSTRACT

Out of the 860 bird species known to occur in Ethiopia, 36 are globally threatened. Two species are red-listed as endangered while 14 are in the vulnerable category, 16 near threatened and four species are considered data deficient. The current paper mainly focuses on 21 globally threatened bird species that are resident in Ethiopia. Issues related to range and population, ecology, threats, and conservation are discussed in the species account section and both old and new information are included. Some Ethiopian species were down listed in the current Threatened Birds of the World and we feel this might have some negative consequences for those species and the down listing is argued against in this paper on the ground that the threats to the species have increased both in type and gravity, and so far there is no effective conservation action in place to protect most of the threatened birds of Ethiopia. The semi-arid habitats (grassland, scrubland, and savanna) were found to be the most important habitats when one considers the number of threatened birds that depend on these habitats. Habitat loss and degradation are the most important causes of threat to the birds of Ethiopia. It is very important to fill the huge information gap by conducting surveys and prioritizing species for action. The implementation of an informed strategy is the only way to achieve the goal of conserving the threatened birds of Ethiopia.

INTRODUCTION

The world’s biodiversity is increasingly under threat in many parts of the world. Currently, 24% of mammals, 27% of reptiles, 20% of amphibians and 30% of fishes are listed by IUCN as globally threatened with extinction (Stattersfield et al., 2000).

Concerning the bird species of the planet, about 12% of them (that is one in 8) have a real risk of becoming extinct in the next 100 years (Stattersfield et al., 2000). Out of the 1186 globally threatened bird species, 182 have only an estimated 50% chance of surviving over the next 10 years, while 321 are endangered, and 680 are vulnerable. An additional 727 (near threatened) species are as close to qualifying as threatened. The fossil record indicates that we might expect one bird species to be lost every 100 years or so (Stattersfield et al., 2000). But 128 birds have been documented as having become extinct over the last 500 years, with 103 of these since 1800. This is more than 50 times the background rate. This increasing rate of

* Ethiopian Wildlife and Natural History Society, PO Box 13303, Addis Ababa, Ethiopia.
extinction is predicted to continue. In 1994, there were 1111 threatened birds (75 fewer than now), when it was predicted that over 400 species could become extinct in the following 100 years and this now had grown to over 460 bird extinctions by 2100 (Stattersfield et al., 2000).

Much of the extinction crisis is a result of human action, since 99% of the 1186 globally threatened species are at risk from human activities such as agriculture, logging, hunting, and trapping (Stattersfield et al., 2000). Therefore, species extinctions are no longer isolated natural events but results of major changes in the world ecosystems. These ecosystems provide vital services, such as maintaining global climate patterns, mediating carbon cycle, safeguarding watersheds and stabilizing soils, valued at c. USD 33 trillion per year (Stattersfield et al., 2000).

The potential loss of large number of species facing extinction is a powerful indicator that the quality of the ecosystem services is deteriorating. People are causing the extinction crisis and they themselves should respond to the problem in a timely fashion and avert the crisis to make this planet habitable both to the present and future generations.

METHODS

Species account: Literature was reviewed to establish facts so far known on the range and population, ecology, threats and conservation status of the foci species and field observation both by the authors and other people that have not yet found their way in to the mainstream literature were included. Whenever deemed necessary, the authors took the liberty to challenge some issues stated or deduced in the current body of literature.

Current problems and future actions: In order to achieve the ultimate objective of removing the globally threatened birds of Ethiopia from the IUCN Red Data List, the most important first step is to identify the major hurdles that inhibit any attempt of conserving these species. Going through both published and unpublished reports on each species, we found out that the information so far compiled on each species is so little that it would be impossible to recommend and initiate any specific conservation action on the ground. We believe that summarizing the information gap and presenting the scattered scenario in one piece would help all interested parties to understand the gravity of the problem and we also believe doing so would simplify the most important task of identifying a study problem for researchers and students alike. For this purpose we have identified biological and other issues relevant to the conservation of the species in concern and attempted to illustrate how much of these issues were so far tackled and what remains to be done before scarce and crucial resources are ‘wasted’ in the name of conserving a globally threatened species. The other important task that we have undertaken was identifying the most important issues that cause demise to Ethiopian birds using the number of threatened birds affected by each threat as index of its gravity and national importance. We have also produced habitat categories and used the number of threatened species they support as an indicator of their importance for
The status of globally threatened resident birds of Ethiopia

Anteneh Shimelis and Yilma Dellelegn

Bird conservation in Ethiopia. The last and most important activity that we have undertaken was prioritizing species for conservation action using a range of criteria. The biological criteria involved ranking species based on habitats qualified in the previous section, estimated extinction risk, endemcity, range, and estimated population size. The five habitat categories used in the ranking of species under the biological criteria include dry land, wetland, highland grassland, forest and cliffs having score values of 5, 4, 3, 2, and 1, respectively (Table 1). The index related to extinction risk followed the standard IUCN categories such as Critically endangered, Endangered, Vulnerable, Near threatened, and Data deficient and the respective score values were 20, 16, 12, 8, and 4 (Table 1). The endemcity factor was considered to capture the national importance of species unique to Ethiopia and 5 and 0 were the score values utilized to determine the importance of a species for the country (Table 1). We have also included a range restriction factor giving highest score for species that are confined to very small areas (Table 1). Species with very small population sizes did also receive higher scores while those with larger populations received lower scores (Table 1). We have also divided the most important threats into three categories and if a threat is critically important for a species, it was scored 5, if qualified as very important, the score was 3, and if it was just important, it received a score value of just 1 (Table 2). Lack of information was also another criteria used to prioritize species for conservation action. Because for all the species the available information on all of the defined categories are insignificant, we decided to give a score value of 1 for each category (Table 3). We latter summed the results from each criterion for each species and came up with a species prioritization matrix (Table 4) after devising a range of categories for the sum totals of the scores.

DISCUSSION

Globally threatened birds of Ethiopia

The total number of globally threatened bird species of Ethiopia is 36, out of which two are endangered, 14 are vulnerable, 16 are in the near threatened category and four are considered to be data deficient (Stattersfield et al., 2000). Twenty-one of the 36 total are resident and will be dealt with in this paper.

SPECIES ACCOUNT

Shoebill (Balaeniceps rex)

IUCN category: The species is red listed as near threatened (Table 1; Stattersfield et al., 2000).

Range and population: this huge, and extraordinary species, which represents a monotypic family, is widely but very locally distributed in large swamps of southern Sudan, Uganda, western Tanzania, and Zambia, with additional populations in Democratic Republic of Congo, Central African Republic and
Rwanda (Stattersfield et al., 2000; Collar and Stuart, 1985). The recently published, Threatened Birds of the World (Stattersfield et al., 2000) didn’t mention some of the formerly known range countries in its description of the distribution of the Shoebill. Countries deleted from the list include Angola and Cameroon from western Africa, Botswana and Malawi from southern Africa and Ethiopia and Kenya from Eastern Africa (Urban, 1967; Duckworth, 1974; Collar and Stuart, 1985). Though it is true that there is no recent record of the species in Ethiopia and possibly in the other discounted range countries, the basis for the exclusion of these countries was not provided. Hence, we preferred to consider the species as one of the 860 or so bird species known to occur in Ethiopia. Though nearly all the reports on the species are very basic and mostly country specific (Collar and Stuart, 1985) there is only a crude estimate of population of the species, which falls between 12000 and 15000 (Rose and Scott, 1997; Stattersfield et al., 2000). There is no information on numbers of the species in Ethiopia (Table 3).

Table 1 Biological criteria.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DL</td>
</tr>
<tr>
<td>Habitat</td>
<td>5</td>
</tr>
<tr>
<td>Extinction risk</td>
<td>20</td>
</tr>
<tr>
<td>Endemicity</td>
<td>1</td>
</tr>
<tr>
<td>Range (km² by 1000)</td>
<td></td>
</tr>
<tr>
<td>Population (by 1000)</td>
<td></td>
</tr>
</tbody>
</table>

Key: DL=Dryland, WL=Wetland, HGL=Highland grassland, F=Forest, C=Cliffs, CEN=Critically endangered, EN=Endangered, NT=Not Threatened, VU=Vulnerable, DD=Data deficient.

Table 2 Threat criteria.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Critically Important</td>
</tr>
<tr>
<td>Agriculture</td>
<td>5</td>
</tr>
<tr>
<td>Overgrazing</td>
<td>5</td>
</tr>
<tr>
<td>Household uses</td>
<td>5</td>
</tr>
<tr>
<td>Persecution</td>
<td>5</td>
</tr>
<tr>
<td>Disturbance</td>
<td>5</td>
</tr>
</tbody>
</table>

Ecology: the Shoebill prefers marshes, swamps, and especially sudd (areas of floating vegetation), often formed by papyrus (Baker, 1996; Stattersfield et al., 2000; Collar and Stuart, 1985; Brown et al., 1982). The species is solitary and unpaired birds forage keeping a distance of about 200 m between them (Möller,
The Status of Globally Threatened Resident Birds of Ethiopia

Anteneh Shimelis and Yilma Dellelegn

1980; Collar and Stuart, 1985). It has a wide range of diet that includes both large and small fish, young turtles and crocodiles, water snakes, monitors, frogs and occasionally warm blooded vertebrates such as rats, young waterfowl and even young lechwe, *Kobus lechwe* (Moller, 1980; Collar and Stuart, 1985). There is a great variation in breeding season across range countries but it generally coincides with the setting of a dry season marking flood subsidence (Moller, 1980; Collar and Stuart, 1985). The normal clutch size is two (Moller, 1980; Collar and Stuart, 1985) and is reported to vary between one and three (Buxton, 1978; Buxton et al., 1978). Almost all of this information is from few range countries and information on the Ethiopian population is negligible (Table 3).

### Table 3 Absence of information.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Scores</th>
<th>Impact of conservation action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RC</td>
<td>Lo</td>
</tr>
<tr>
<td>Range</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Population</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Habitat</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Interaction</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Threats</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Key: RC=Range countries, Lo=Localities, Ex=Range extension, Co=Range contraction, D=Density, T=Total population, Bpr=Breeding pairs, A=Adult, J=Juvenile, Tr=Population trend, Av=Habitat availability, Fee=Feeding requirement, Bre=Breeding requirement, Tol=Tolerance to habitat disturbance, Typ=Threat type, Cau=Cause of threat, lwt=Impact with time.

**Threats:** the population of the species is believed to be declining as a result of loss of habitat and degradation, disturbance, and persecution (Tables 1 and 2; Stattersfield et al., 2000). The main causes of threat include fire, drought and destruction of papyrus swamps by cattle, and there are also reports of trapping, persecution and disturbance mainly by large herbivores that trample nests while feeding in the swamps (Baker, 1996; Renson, 1998; Collar and Stuart, 1985; Stattersfield et al., 2000).

**Conservation:** in Ethiopia there isn’t any conservation action to protect the species by adopting any of the categories listed in Table 2. It is very important to initiate and implement research, which aims at monitoring all the important aspects of the ecology of the species so that suitable conservation action could be recommended and put in action.
Lappet-faced Vulture (*Torgos tracheliotus*)

**IUCN category:** the species is considered *vulnerable* to extinction (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** in addition to Ethiopia the species is known to occur in 33 countries in Africa and the middle-east and amongst these countries it is believed to be extinct in Morocco, Tunisia and Algeria since the 1930s (Stattersfield *et al.*, 2000). There is an increasing number (in excess of 500 individuals) found in Saudi Arabia and small populations in southern Egypt, and possibly in Western Sahara and Mauritania. The Nigerian population has been declining since the late 1970s and it may now have been extirpated (Stattersfield *et al.*, 2000). It probably bred in Jordan and may no longer do so in Israel. The population in southern Africa is estimated to be about 3000 and it is suspected to be more or less the same in north-east and eastern Africa, and possibly c.500 pairs in west Africa and the Sahara, totaling the African population to about 8000 individuals (Stattersfield *et al.*, 2000).

**Ecology:** covers a wide range while foraging, the main food items being any large carcasses and their remains. It builds solitary nests containing, usually, just one egg. The chick takes at least six years to get mature enough to breed and fledges c. 0.4 young/pair/year (Stattersfield *et al.*, 2000).

**Threats:** the species population is declining (Table 1) the main threats being persecution and disturbance. It is mainly threatened by accidental poisoning as a result of use of strychnine by farmers to control predators and it is also often mistakenly persecuted as a livestock predator. Increase in the use of agricultural pesticides and nest disturbance, to which it is extremely sensitive, are also problems of serious concern (Stattersfield *et al.*, 2000).

**Conservation:** the species is a new addition to the vulture red list and so far didn’t get any conservation attention in Ethiopia and the existence of a few individuals in some of the ‘protected’ areas is not encouraging since conservation even in such areas is nominal (EWNHS, 1996).
Table 4  A matrix that prioritizes globally-threatened resident birds of Ethiopia for conservation based on ecological criteria (endemicity (En), global range (Gr), and population (Pon), Habitat (Ha), and Global threat status (Gts) with scores ranging from 0 to 6, except for habitat where the score involves 1,3, and 5, and 4, 8, 12, 16 and 20 for the global threat status and in the case of the endemicity factor the score values are 0 or 5).

<table>
<thead>
<tr>
<th>Species (ordered taxonomically)</th>
<th>En score</th>
<th>Gr score</th>
<th>Pop score</th>
<th>Gts score</th>
<th>Ha score</th>
<th>Total</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoebill <em>Balaeniceps rex</em></td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
<td>3</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Lappet-faced Vulture <em>Torgos tracheliotus</em></td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>12</td>
<td>5</td>
<td>22</td>
<td>8</td>
</tr>
<tr>
<td>Taita Falcon <em>Falco fasciinucha</em></td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>8</td>
<td>5</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td>Harwood’s Francolin <em>Francolinus harwoodi</em></td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>12</td>
<td>5</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td>White-winged Flufftail <em>Sarothrura ayresi</em></td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>16</td>
<td>4</td>
<td>26</td>
<td>6</td>
</tr>
<tr>
<td>Rouget’s Rail <em>Rougetus rougetti</em></td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>4</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Wattled Crane <em>Grus carunculatus</em></td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>12</td>
<td>4</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Little Brown Bustard <em>Eupoditis humilis</em></td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>White-winged Dove <em>Streptopelia rechenowi</em></td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Prince Ruspoli’s Turaco <em>Tauraco ruspolii</em></td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>16</td>
<td>2</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>Friedman’s Bush Lark <em>Mirafra pulpa</em></td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Degodi Lark <em>Mirafra digodiensis</em></td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>5</td>
<td>34</td>
<td>3</td>
</tr>
<tr>
<td>Sidamo Long-clawed Lark <em>Heteromirafra sidamoensis</em></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>16</td>
<td>5</td>
<td>36</td>
<td>2</td>
</tr>
<tr>
<td>White-tailed Swallow <em>Hirundo megaensis</em></td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>12</td>
<td>5</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>Abyssinian Longclaw <em>Macronyx flaviicolis</em></td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Sombre Rock Chat <em>Cercomela dubia</em></td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>Somali Short-billed Crombec <em>Sylvietta philipae</em></td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Abyssinian Bush Crow <em>Zavattariornis stresemanni</em></td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>12</td>
<td>5</td>
<td>32</td>
<td>4</td>
</tr>
<tr>
<td>Yellow-throated Serin <em>Serinus flavigula</em></td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>16</td>
<td>5</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>Salvadori’s Serin <em>Serinus xantholaemus</em></td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>22</td>
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<tr>
<td>Ankober Serin <em>Serinus ankoberensis</em></td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>16</td>
<td>1</td>
<td>25</td>
<td>7</td>
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<tr>
<td>Species (ordered taxonomically)</td>
<td>Global Status</td>
<td>Distribution</td>
<td>Global popn.</td>
<td>Altitude</td>
<td>Habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------</td>
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<td>--------------</td>
<td>----------</td>
<td>---------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoebill Balaeniceps rex</td>
<td>NT</td>
<td>?</td>
<td>Baro River (Gambella)</td>
<td>12,000-5,000</td>
<td>Lowland</td>
<td>Swampland</td>
<td></td>
</tr>
<tr>
<td>Lappet-faced Vulture Torgos tracheliotus</td>
<td>VU</td>
<td>8,680,000 km²</td>
<td>Widespread</td>
<td>8,500</td>
<td>0-2800 m</td>
<td>Savanna, desert</td>
<td></td>
</tr>
<tr>
<td>Taita Falcon Falco fasicinctus</td>
<td>NT</td>
<td>?</td>
<td>Southern Ethiopia</td>
<td>1000</td>
<td>&lt; 3800 m</td>
<td>Gorges and escarpments in semi-arid country</td>
<td></td>
</tr>
<tr>
<td>Harwood’s Francolin Francolinus harwoodi</td>
<td>VU</td>
<td>17,000 km²</td>
<td>Blue Nile Basin</td>
<td>&gt; 10,000</td>
<td>1450-1800 m</td>
<td>Shrubland, wetland in semi-arid country</td>
<td></td>
</tr>
<tr>
<td>White-winged Flufftail Sarothrura ayresi</td>
<td>EN</td>
<td>250/374 km²</td>
<td>Sululta, Berga and Weserbi (Central Shoa)</td>
<td>700</td>
<td>1100-2600 m</td>
<td>Grassland in the highlands</td>
<td></td>
</tr>
<tr>
<td>Rouget’s Rail Rougetus rougetti</td>
<td>NT</td>
<td>?</td>
<td>Highlands of Ethiopia</td>
<td>?</td>
<td>1500-4100 m</td>
<td>Montane grasslands and moorlands, lush grasses and reeds along streams</td>
<td></td>
</tr>
<tr>
<td>Wattled Crane Grus carunculatus</td>
<td>VU</td>
<td>2,302,000 km²</td>
<td>Rift Valley, Wereta, Kurt Bahir, and Bale Mountains</td>
<td>13,000-15,000</td>
<td>0-4140 m</td>
<td>Wetland</td>
<td></td>
</tr>
<tr>
<td>Little Brown Bustard Eupoditis humilis</td>
<td>NT</td>
<td>Lower Wabishebelle and Warder</td>
<td>?</td>
<td>?</td>
<td>Open thorn bush</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-winged Dove Streptopelia rechenowi</td>
<td>NT</td>
<td>?</td>
<td>Juba, Dawa and Shebele rivers</td>
<td>?</td>
<td>Lowland</td>
<td>Riparian woodland in semi-arid country</td>
<td></td>
</tr>
<tr>
<td>Prince Ruspoli’s Turaco Tauraco rupolii</td>
<td>VU</td>
<td>12,000 km²</td>
<td>Arero, Bobela, Sokora, Negele, Wadera (Southeastern Ethiopia)</td>
<td>&gt; 10,000</td>
<td>1275-1800 m</td>
<td>Forest</td>
<td></td>
</tr>
<tr>
<td>Friedman’s Bush Lark Mirafra pulpa</td>
<td>DD</td>
<td>?</td>
<td>Southern Ethiopia (near the border with Kenya)</td>
<td>?</td>
<td>Lowland</td>
<td>Grassland in semi-arid country</td>
<td></td>
</tr>
<tr>
<td>Degodi Lark Mirafra digodiensis</td>
<td>VU</td>
<td>430 km²</td>
<td>Bogol Manya (Southeastern Ethiopia)</td>
<td>250-999</td>
<td>Lowland</td>
<td>Shrubland in semi-arid country</td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Status</td>
<td>Range</td>
<td>Population</td>
<td>Altitude</td>
<td>Habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>--------</td>
<td>-----------</td>
<td>--------------</td>
<td>----------</td>
<td>----------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidamo Long-clawed Lark <em>Heteromira</em></td>
<td>VU</td>
<td>5,400 km²</td>
<td>Negele (Southeastern Ethiopia)</td>
<td>2,500-5,000</td>
<td>1450 m Savanna in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>sidamoensis</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White-tailed Swallow <em>Hirundo megaensis</em></td>
<td>VU</td>
<td>14,900 km²</td>
<td>Mega and Yabello (South Ethiopia)</td>
<td>2,500-10,000</td>
<td>Lowland Grassland in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abyssinian Longclaw <em>Macronyx filavicolli</em></td>
<td>NT</td>
<td>?</td>
<td>Highlands of Ethiopia, except extreme N and W</td>
<td>?</td>
<td>1200-4100 m Highland grassland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sombre Rock Chat <em>Cercomela dubia</em></td>
<td>DD</td>
<td>?</td>
<td>Awash Valley and Awash National Park</td>
<td>?</td>
<td>Lowland Rock and scrub in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somali Short-billed Crombec <em>Sylvietta philipae</em></td>
<td>DD</td>
<td>?</td>
<td>South Ethiopia (bordering North-west Somalia)</td>
<td>?</td>
<td>300-900 m Acacia-Commiphora scrub on rocky area and sandy soil in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abyssinian Bush Crow <em>Zavattariornis stresemanni</em></td>
<td>VU</td>
<td>4,600 km²</td>
<td>Yabello and Mega (South Ethiopia)</td>
<td>&gt; 10,000</td>
<td>Lowland Acacia-Savanna in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow-throated Serin <em>Serinus flavigula</em></td>
<td>VU</td>
<td>4,630 km²</td>
<td>Awash National Park, Aliyu Amba Dulecha</td>
<td>250-999</td>
<td>1400-1500 m Shrubland, grassland in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salvadori’s Serin <em>Serinus xantholaemus</em></td>
<td>NT</td>
<td>?</td>
<td>Bisidimo, Sof-Omar, Shek Husein, Arero, Mankubsa-Welenso Anferera, Bra Dhera, and Yabello</td>
<td>?</td>
<td>1000-1500 m Wooded grassland in semi-arid country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ankober Serin <em>Serinus ankoberensis</em></td>
<td>EN</td>
<td>?</td>
<td>Ankober, Guasa, Lerni, Simen Mountains, Abune Yosef</td>
<td>&gt;10,000</td>
<td>2600-4250 m Grassland, Inland Cliffs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6  Quality and quantity of information so far compiled on globally threatened resident birds of Ethiopia (specifically in Ethiopia).

<table>
<thead>
<tr>
<th>Species (ordered taxonomically)</th>
<th>Range</th>
<th>Population</th>
<th>Habitat</th>
<th>Interaction</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cou</td>
<td>Lo</td>
<td>Ex/Con</td>
<td>Den</td>
<td>Tot</td>
</tr>
<tr>
<td>Shoebill <em>Balaeniceps rex</em></td>
<td>(+)</td>
<td>(+)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lappet-faced Vulture <em>Torgos tracheliotus</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Taita Falcon <em>Falco fasciinucha</em></td>
<td>+</td>
<td>- (+)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Harwood’s Francolin <em>Francolinus harwoodi</em></td>
<td>+</td>
<td>+ (-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White-winged Flufftail <em>Sarothrura ayrensi</em></td>
<td>+</td>
<td>+</td>
<td>-(+)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rouget’s Rail <em>Rougetus rougetti</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Wattled Crane <em>Grus carunculatus</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Little Brown Bustard <em>Eupoditis humilis</em></td>
<td>+’</td>
<td>+ (-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White-winged Dove <em>Streptopelia rechenowi</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prince Ruspoli’s Turaco <em>Tauraco ruspolii</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Friedman’s Bush Lark <em>Mirafra pulpa</em></td>
<td>+</td>
<td>- (+)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Species</td>
<td>Cou</td>
<td>Lo</td>
<td>Ex/Con</td>
<td>Den</td>
<td>Tot</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-----</td>
<td>----</td>
<td>--------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Degodi Lark <em>Mirafra digodiensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sidamo Long-clawed Lark <em>Heteromirafra sidamoensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White-tailed Swallow <em>Hirundo megaensis</em></td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Abyssinian Long-claw <em>Macronyx flavicollis</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Sombre Rock Chat <em>Cercomela dubia</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Somali Short-billed Crombec <em>Sylvietta philipae</em></td>
<td>+</td>
<td>-(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Abyssinian Bush Crow <em>Zavattariornis stresemanni</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Yellow-throated Serin <em>Serinus flavigula</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Salvadori’s Serin <em>Serinus xantholaemus</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ankober Serin <em>Serinus ankoberensis</em></td>
<td>+</td>
<td>+(-)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: Cou=Country; Lo=Locality; Ex/Con=Expansion/Contraction; Den=Density; Tot=Total; Brp=Breeding Pairs; Ad/J=Adult/Juvenile; Tre=Population trend; Hav=Habitat availability; Fee=Feeding requirement; Bre=Breeding requirement; Tole=Tolerance to habitat destruction; Typ=Type; Cau=Cause of threat; Iwt=Impact with time; (+)=Well documented; (+-) =Sufficient documentation with significant shortcomings; -(+) =Insufficient information; (-) =Information almost totally lacking.
Table 7 Conservation status and factors threatening globally-threatened resident birds of Ethiopia.

<table>
<thead>
<tr>
<th>Species (ordered taxonomically)</th>
<th>Conservation</th>
<th>Threat types</th>
<th>Causes of threat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Species</td>
<td>Habitat</td>
<td>Site</td>
</tr>
<tr>
<td>Shoebill <em>Balaeniceps rex</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Lappet-faced Vulture <em>Torgos tracheliotus</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Taita Falcon <em>Falco fascinucha</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Harwood’s Francolin <em>Francolinus harwoodi</em></td>
<td>-(+)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White-winged Flufftail <em>Sarothrura ayresi</em></td>
<td>-(+)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rouget’s Rail <em>Rougetus rougetti</em></td>
<td>-</td>
<td>-</td>
<td>-(+)</td>
</tr>
<tr>
<td>Wattled Crane <em>Grus carunculatus</em></td>
<td>-</td>
<td>-</td>
<td>-(+)</td>
</tr>
<tr>
<td>Little Brown Bustard <em>Eupoditis humilis</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>White-winged Dove <em>Streptopelia rechenowi</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Prince Ruspoli’s Turaco <em>Tauraco ruspolii</em></td>
<td>-(+)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Friedman’s Bush Lark <em>Mirafra pulpa</em></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Degodi Lark <em>Mirafra digodiens</em></td>
<td>-</td>
<td>-</td>
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</tr>
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</table>

*Proceedings of a National Workshop (BSE, February 2002)*
<table>
<thead>
<tr>
<th>Species</th>
<th>Conservation Action</th>
<th>Threats</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidamo Long-clawed Lark</td>
<td>-</td>
<td>Habitat loss and degradation,</td>
<td>***</td>
</tr>
<tr>
<td><em>Heteromirafra sidamoensis</em></td>
<td>-</td>
<td>disturbance</td>
<td>***</td>
</tr>
<tr>
<td>White-tailed Swallow</td>
<td>-</td>
<td>Habitat loss and degradation,</td>
<td>***</td>
</tr>
<tr>
<td><em>Hirundo megaensis</em></td>
<td>-(+)</td>
<td>disturbance</td>
<td>?</td>
</tr>
<tr>
<td>Abyssinian Longclaw</td>
<td>-</td>
<td>Habitat loss and degradation,</td>
<td>***</td>
</tr>
<tr>
<td><em>Macronyx flavigollis</em></td>
<td>-(+)</td>
<td>disturbance</td>
<td>?</td>
</tr>
<tr>
<td>Sombre Chat</td>
<td>-</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td><em>Cercomela dubia</em></td>
<td>-</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Somali Short-billed</td>
<td>-</td>
<td>Habitat loss and degradation</td>
<td>***</td>
</tr>
<tr>
<td>Crombec <em>Sylvieta philipae</em></td>
<td>-</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Abyssinian Bush Crow</td>
<td>-</td>
<td>Habitat loss and degradation</td>
<td>***</td>
</tr>
<tr>
<td><em>Zavattariornis stresemanni</em></td>
<td>-(+)</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Yellow-throated Serin</td>
<td>-</td>
<td>Habitat loss and degradation</td>
<td>***</td>
</tr>
<tr>
<td><em>Serinus flavigula</em></td>
<td>-(+)</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Salvadori’s Serin</td>
<td>-</td>
<td>Habitat loss and degradation</td>
<td>***</td>
</tr>
<tr>
<td><em>Serinus xantholaemus</em></td>
<td>-(+)</td>
<td></td>
<td>?</td>
</tr>
<tr>
<td>Ankober Serin</td>
<td>-</td>
<td>Habitat loss and degradation</td>
<td>***</td>
</tr>
<tr>
<td><em>Serinus ankoberensis</em></td>
<td>-(+)</td>
<td></td>
<td>?</td>
</tr>
</tbody>
</table>

Key: (-)=conservation action non-existent; (+)=conservation action fully operational; -(+)=insignificant conservation action; +(-)=some conservation action with no satisfactory results; Ag=agriculture; OS=overstocking of domestic livestock; Dis=human disturbance; Per=direct persecution; (***)=critically important cause of threat; (**)=very important cause of threat; *=important cause of threat; (?)=cause of threat with indeterminate importance; (0)=cause of threat non-existent.
Taita Falcon (*Falco faciinucha*)

**IUCN Category:** the species is considered *near threatened* (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** the species has a widespread, though discontinued, distribution in Africa. Its range in east Africa extends from southern Ethiopia through Kenya to Uganda and northeastern Tanzania (Stattersfield *et al.*, 2000). Its southern range covers Zambia, Malawi, Mozambique, and South Africa (Stattersfield *et al.*, 2000). In all the countries where it is known to occur its distribution is extremely patchy and records are from “few” sites per country. The species is known to be uncommon to rare throughout its range and described as relatively common in Uganda and it is estimated that the total population of mature individuals may exceed 1000 (Stattersfield *et al.*, 2000). A recent study estimated that 20-50 pairs are found in Zimbabwe and none is available for the rest of range countries (Stattersfield *et al.*, 2000). The Ethiopian population is one of the least known with no proven breeding record (Table 6).

**Ecology:** the species inhabits semi-arid country preferring, both for roosting and nesting, gorges and escarpments (up to 3800 m) and often avoids river valleys (White *et al.*, 1996; Stattersfield *et al.*, 2000). It mainly feeds on small birds (Stattersfield *et al.*, 2000).

**Threats:** the decline in the population of the species is the result of pesticide spraying and disturbance (Table 7) (Stattersfield *et al.*, 2000). There is no any information on the kinds of threats being faced by the species (Table 6).

**Conservation:** the species is not at all protected in Ethiopia (Table 7).

Harwood’s Francolin (*Francolinus harwoodi*)

**IUCN category:** the species is red listed as *vulnerable* to extinction (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** Harwood’s Francolin is endemic to the highlands of central and northeastern Ethiopia around the Blue Nile River and its tributaries (Robertson *et al.*, 1997; Anteneh Shimelis (unpubl.); Mengistu Wondafrash (unpubl.); Yirmed Demeke *et al.* (unpubl.); Stattersfield *et al.*, 2000). This species which was formerly known only from Jemma valley in Merhabete (EWNHS, 1996; Ash and Gullick, 1985) is now recorded in localities in southern Wello, and northwest in to Eastern Gojam administrative zones (Anteneh Shimelis (unpubl.), Yirmed Demeke *et al.* (unpubl.)). Research in 1996 found it locally abundant in the Jemma and Jara valleys and the adjacent valleys and river catchments of North Shewa, with an estimated maximum density of 92 birds/km² (Robertson *et al.*, 1997).
Ecology: the species was believed to be almost entirely restricted to *Typah* (bulrush) growing along rivers and *Acacia* thorn scrub (Robertson *et al.*, 1997; Stattersfield *et al.*, 2000). However, studies in 1996 found it at a site with no permanent river or *typah*, with evidence of birds feeding near and with in farmyards and roosting in thorn scrub on hillsides (Robertson *et al.*, 1997; Anteneh Shimelis (unpubl.)). The breeding season is reported to be from September to December and the clutch size as 4-7 (Stattersfield *et al.*, 2000).

Threats: the species population is declining (Table 1) mainly as a result of clearance for agriculture, firewood and construction (EWNHS 1996; Anteneh Shimelis (unpubl.); Stattersfield *et al.*, 2000). Surveys in 1998 found areas between localities had thin and patchy vegetation (Anteneh Shimelis (unpubl.); Stattersfield *et al.*, 2000) and *Typah* beds are burnt annually to plant cotton, and are also cut for thatching (EWNHS, 1996; Anteneh Shimelis (unpubl.); Robertson *et al.*, 1997; Stattersfield *et al.*, 2000). The species is heavily hunted for food and eggs are also collected (Robertson *et al.*, 1997; Anteneh Shimelis (unpubl.); Stattersfield *et al.*, 2000).

Conservation: there was an awareness creation workshop and a poster was produced and distributed to promote the conservation of the species (EWNHS 1 and 2, 1999 (unpubl.)). Except for this, the species has never been a conservation target in Ethiopia (Table 7).

**White-winged Flufftail (*Sarathurura ayresi*)**

IUCN category: the species is considered *endangered* to extinction (Table 1) Stattersfield *et al.*, 2000

Range and population: the species occurs at two sites in Ethiopia (Table 1) where the only proven breeding record of the species was made (Taylor 1998 and 1999, Taylor and Vanperlo, 1998), Zimbabwe and South Africa. The occupied breeding range of the species is estimated to be not more than 250 km$^2$ (Stattersfield *et al.*, 2000). 235 is the estimate for the total population in South Africa and 10-15 pairs are believed to be breeding at Sululuta, central Ethiopian highlands and c. 200 individuals were flushed at Berga flood plain (Anteneh Shimelis (unpubl.); Atkinson *et al.*, 1996; Taylor, 1998; Stattersfield *et al.*, 2000).

Ecology: inhabits dense, short marsh vegetation, shallowly flooded in the wet season and dominated by sedges, grasses and forbes (Taylor, 1996; Taylor and Vanperlo, 1998; Stattersfield *et al.*, 2000). It may migrate or is nomadic in search of suitable habitats, though issues related to its movement are yet to be resolved (Stattersfield *et al.*, 2000). In Ethiopia the bird is present between June and October at 2200-2600 m while non-breeding birds in South Africa are present from November to March mostly at 1100-1900 m (Tylor (unpubl.), Stattersfield *et al.*, 2000).
Threats: the main threat to the species is habitat loss and degradation (Table 7) as a result of drainage for cultivation and forestry, flooding by dams, catchment erosion, and water abstraction. People cutting the marshy vegetation and grazing livestock cause excessive disturbance to the species (Atkinson et al., 1996, Anteneh Shimelis (unpubl.), Taylor and Vanperlo, 1998, Taylor (unpubl.), Stattersfield et al., 2000). The species might also be experiencing some persecution. Though it is not established, tourists who come annually to Sululuta and Berga to hunt different species of snipes might also target the flufftail (Anteneh Shimelis (unpubl.)).

Conservation: some South African sites are protected legally and by the landowners themselves (Stattersfield et al., 2000). In Ethiopia the species is not under any kind of conservation scheme (Table 7) and the actions taken to protect the species don’t go beyond an awareness creation campaign which include organizing one workshop to some stakeholders, writing one letter to the Investment Authority, and recently an interest group, comprising members of the local community is organized and functioning (EWNHS, 1999 (unpubl.), EWNHS 2001 (unpubl.)).

Rouget’s Rail (Rougetius rougetii)

IUCN category: near threatened to extinction (Table 1; Stattersfield et al., 2000)

Range and population: the species is endemic to Ethiopia and Eritrea (EWNHS, 1996; Urban et al., 1986; Stattersfield et al., 2000). It appears to have maintained its distribution but have suffered a reduction in numbers (EWNHS, 1996; Stattersfield et al., 2000).

Ecology: the species prefers habitats in the range of 1500 and 4100 m frequenting marshy areas within montane grasslands and moor lands, areas dominated by lush grass, reeds and bushes along streams, ponds and it is also found in Alchemilla bogs (EWNHS, 1996; Urban et al., 1986; Stattersfield et al., 2000). It is also found in dry ground among heath and Alchemilla, and adapts well to human modified habitats such as lawns, shrubbery and thickets in parks and urban gardens. It feeds on seeds and aquatic insects (Urban et al., 1986; Stattersfield et al., 2000).

Threats: the species population is believed to be declining due to habitat loss and degradation (Table 7) resulted from increased cultivation, overgrazing and grass cutting mainly for building (Stattersfield et al., 2000). Cattle while grazing and people cutting grass may cause some disturbance (Table 7) to the species, especially through trampling of nests.

Conservation: some populations of the species are found in parks such as the Bale Mountains and Simen Mountains but the size of the population of the species may not be high enough to claim that the species is well captured under the site conservation scheme (Table 7).
Wattled Crane (*Grus carunculatus*)

**IUCN category:** vulnerable to extinction (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** the species is very much widespread (Table 1) occurring in Ethiopia, Tanzania and Democratic Republic of Congo from east and central Africa. Zambia, Malawi, Angola, Mozambique, Zimbabwe, Botswana, Namibia and South Africa are also the range countries in southern and western Africa (Stattersfield *et al.*, 2000). The total population of the species is in the range of 13000-15000 (Table 1) with the highest estimate (c.5500) for Zambia (Stattersfield *et al.*, 2000). The largest population recorded for Ethiopia, in recent years, is between 60 and 70 at Boyo wetland, southern Ethiopia (Anteneh Shimelis, unpubl.).

**Ecology:** it is dependent on wetlands, congregating in large numbers at large wetlands on riparian flood plains, but also requiring, pristine or semi-pristine high altitude wetlands and grasslands in some places (Stattersfield *et al.*, 2000).

**Threats:** the primary threat is habitat loss and degradation (Table 7) which resulted from increased cultivation, drainage, flooding by dam construction (Anteneh Shimelis, unpubl.; Stattersfield *et al.*, 2000). Other threats include nest disturbance, poisoning, and persecution (Stattersfield *et al.*, 2000). The population in Ethiopia may be facing a risk of poisoning by farmers because it is one of the ‘pests’ destroying an annual grass called teff (Anteneh Shimelis, unpubl.).

**Conservation:** protection in other range countries is well underway (Stattersfield *et al.*, 2000) but almost all of the Ethiopian population (except for about 10 individuals in the Bale Mountains National Park and some at Abijata lakes National Park) is not currently protected (Table 7).

Little Brown Bustard (*Eupodotis humilis*)

**IUCN category:** the species is considered near threatened implying that it is one of the species in the lower risk category (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** the species is endemic to eastern extremes of Ethiopia, specifically Lower Wabi Shebelle and Warder (Table 1), and north and west central Somalia (Urban *et al.*, 1986; EWNHS 1996, Stattersfield *et al.*, 2000). Though a population estimate is not available to the species (Table 1), records show that in Ethiopia it was not uncommon between 1969 and 1976 (Urban *et al.*, 1986), but was not recorded during field surveys conducted between 1995 and 1996 (EWNHS, 1996; Stattersfield *et al.*, 2000).

**Ecology:** it prefers light, open thorn bush and occasionally also adjacent tussock plains, where it feeds on insects, small reptiles and seeds (Urban *et al.*, 1986, Stattersfield *et al.*, 2000). Its breeding season extends from April to August, nesting on the ground where the soil is sandy; normally the clutch size is two and occasionally it lays three eggs (Stattersfield *et al.*, 2000).
Threats: the species is facing a risk of extinction, mainly because of habitat loss (Table 7) resulting from clearance for cultivation, overgrazing and establishment of huge refugee camps in the Ogaden region (Stattersfield et al., 2000). In addition, droughts and war, which may have caused serious disturbance (Table 7) in the heart of the species range, may have disrupted breeding and caused a sharp population decline (Stattersfield et al., 2000).

Conservation: as described in Table 1, the species has not benefitted from any kind of conservation action in Ethiopia.

White-winged Dove (*Streptopelia reichnowi*)

IUCN category: listed as near threatened to extinction (Table 1; Stattersfield et al., 2000).

Range and population: the White-winged Dove is endemic to Ethiopia and Somalia being restricted to the vicinities of the Dawa, Jubba and Shebelle rivers (Table 1; Urban et al., 1986; EWNHS, 1996; Stattersfield et al., 2000). The species appears to be relatively common throughout its range (EWNHS, 1996; Stattersfield et al., 2000).

Ecology: riverine woodlands in semi-arid country (Table 1), usually near water, are the natural habitats to the species (Urban et al., 1986; EWNHS, 1996; Stattersfield et al., 2000). It is also known to inhabit areas altered by humans as indicated in records of the species in Somalia towns and windbreaks planted next to irrigation channels in the Ethiopian side of its range. It forages on the ground, berries being an important food item (Stattersfield et al., 2000).

Threats: the species main threat is loss and degradation of its habitat mainly through the destruction of riverine woodland owing to conversion to agriculture and to fire wood collection (EWNHS, 1996; Stattersfield et al., 2000).

Conservation: no conservation action (Table 7) is in place to protect the species. The widespread threats to the species natural habitat cause some concern for its future, but its ability to colonize secondary habitats (near water) may be sufficient to ensure its survival (Stattersfield et al., 2000).

Prince Ruspoli’s Turaco (*Tauraco ruspolii*)

IUCN category: species has been downlisted from the higher risk Endangered category to the relatively lower risk vulnerable category (Table 1; Stattersfield et al., 2000).

Range and population: the Prince Ruspoli’s Turaco is a species, which has patchy distribution within its own tiny global range (Table 1) restricted only to southern Ethiopia (EWNHS, 1996; Bohrgehesio, 1997a,b; Anteneh Shimelis (unpubl.), Collar and Stuart, 1985; Stattersfield et al., 2000). The only localities from which it is known are Arero, Bobela, Sokora, Negele and Wadera (EWNHS, 1996; Collar
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and Stuart, 1985; Anteneh Shimelis (unpubl.), Bohrgehesio, 1997a,b; Turner, 1997; Stattersfield et al., 2000). Its total population is assumed to be greater than 10000 (Table 1; Stattersfield et al., 2000) and the majority of the population of the species is suspected to be accumulated in the Anferera-Wadera and the Bore-Anferera forests which make up the northern part of the species range (EWNHS, 1996; Anteneh Shimelis (unpubl.), Stattersfield et al., 2000).

Ecology: the species is an arboreal frugivore, and has been found in Juniper woodlands, mixed broad-leaved woodlands, Acacia woodland along streams and woodland edge (Collar and Stuart, 1985; Stattersfield et al., 2000). It is most common at mid altitude (EWNHS, 1996) in habitats with relatively low humidity, and intermediate between lowland thorn bush and montane forest (Borghesio, 1997a,b; Stattersfield et al., 2000). The diet includes fruits of Ficus, Juniperus and Podocarpus (Borghesio, 1997b).

Threats: the major threat to the species is habitat loss and degradation (Table 7) mainly due to clearance for cultivation and fire (EWNHS, 1996; Anteneh Shimelis (unpubl.), Borgehesio, 1997a,b; Stattersfield et al., 2000).

Freidman's Lark (Mirafrapulpa)

IUCN category: data deficient (Table 1; Stattersfield et al., 2000).

Range and population: the species was seen probably only twice in Ethiopia in 1998, since the collection of the type specimen in 1912 (Anteneh Shimelis and Sileshi Dejene, 2000; Stattersfield et al., 2000). The species is known only from six specimens and a few site observations, principally from the Tsavo East and West National Parks and there are also several records from Makomazi Game Reserve in Tanzania and one record from South of Arusha (Stattersfield et al., 2000). Because the species was seen only during a certain season, for example observations at Tsavo are during the rains, it has been suggested that the species might be migratory. But there is no information on the extent and pattern of movement. The species is extremely rare in all of the range countries (Stattersfield et al., 2000).

Ecology: the species appears to prefer dense grassland with bushes, possibly avoiding drier areas, and feeds on grass seeds, small grasshoppers and beetles (Stattersfield et al., 2000). Almost nothing is known concerning the species ecology (Table 6).

Threats: there are no known threats to the species (Stattersfield et al., 2000).

Conservation: especially in Ethiopia, where it was discovered for the first time, the Friedman's Lark has not received any attention from conservationists (Table 7). The single record of it made in Mago National Park (Anteneh Shimelis and Sileshi Dejene, 2000) cannot be taken as an evidence to suggest that the species might be enjoying some protection since we do not know how many of them are found at least within the premises of the park and it has not been established whether the
species appeared at the site accidentally (as a vagrant) or it had been there in the past but escaped notice of birdwatchers who visited the area.

Degodi Lark (*Mirafra digodiensis*)

**IUCN category:** considered *vulnerable* to extinction (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** the Degodi Lark is a species with a tiny global range (Table 1) restricted only to Bogol Manya in Southern Ethiopia (EWNHS, 1996; Collar and Stuart, 1985; Stattersfield *et al.*, 2000). It was known only from two specimens collected together in November 1971 near Bogol Manya (Collar and Stuart, 1985), until four birds were observed at the type locality in February 1989 (Stattersfield *et al.*, 2000). Since then a few records of the species were made between 1995 and 1998 (Stattersfield *et al.*, 2000). The estimated global population of the species is in the range of 200 to 999 (Table 1) and it might occur in up to 2000 km$^2$ of additional suitable habitat (Stattersfield *et al.*, 2000).

**Ecology:** it prefers low Acacia bushes on bare soil, with scattered bushes of other species such as *Commiphora* at 350 m (Stattersfield *et al.*, 2000). Its diet includes caterpillars and small orthopterans.

**Threats:** the species is suffering from habitat loss and degradation (Table 7) resulted mainly from overgrazing and collection of fuel wood both by the pastoralist community and those who supply the same to the nearby urban centers and refugee camps (EWNHS, 1996; Stattersfield *et al.*, 2000). The species might also be confined to its current small range since the surrounding area appears to be occupied by *M. gilletti* (Stattersfield *et al.*, 2000).

**Conservation:** the species is not part of any of the existing conservation schemes (Table 7) in Ethiopia.

Sidamo Lark (*Heteromirafra sidamoensis*)

**IUCN category:** downlisted from its previous *Endangered* status to *vulnerable* (Table 1; Stattersfield *et al.*, 2000).

**Range and population:** the Sidamo Lark is restricted to an area of not more than 5400 km$^2$ (Table 1) in the Negele area of southern Ethiopia and that makes its global range (EWNHS, 1996; Collar and Stuart, 1985; Stattersfield *et al.*, 2000). Its global population is estimated to be in the range of 2500 and 5000 (Stattersfield *et al.*, 2000). Apparently, there is a substantial amount of seemingly suitable habitat near the type locality and careful searches in the future might result in increase both in the range and the total population estimate of the species (Stattersfield *et al.*, 2000; EWNHS, 1996).

**Ecology:** the species prefers open savanna (Table 1) with few scattered Acacia trees (EWNHS, 1996; Collar and Stuart, 1985; Stattersfield *et al.*, 2000).
Threats: the species is threatened by habitat loss and degradation mainly due to overgrazing and agricultural encroachment (Table 7; EWNHS, 1996; Stattersfield et al., 2000). Disturbance is also a major problem to the species (Table 7) due to the high density of cattle grazing in the area and the military training center, which is still operational at the type locality (EWNHS, 1996; Stattersfield et al., 2000).

Conservation: none (Table 7).

White-tailed Swallow (*Hirundo megaensis*)

IUCN category: vulnerable (Table 1; Stattersfield et al., 2000).

Range and population: the White-tailed Swallow is endemic to a tiny area of not more than 14000 km$^2$ (Table 1), between and around Yabello and Mega, in the Borena zone of southern Ethiopia (EWNHS, 1996; Collar and Stuart, 1985; Stattersfield et al., 2000; Anteneh Shimelis (unpubl.)). Though there is no population estimate for the species, it is believed it may be in the range of 2500-10000 (Stattersfield et al., 2000) and it was described as frequent to common on 60 km stretch between Yabello and Mega (Ash and Gullick, 1989). A recent survey (October 1999-June 2000) of the range area found the species to be quite rare, recording not more than two birds per month (Anteneh Shimelis in litt., 2000) indicating that the species population might have undergone a substantial decline.

Ecology: the species inhabits open, arid, short-grass savanna with scattered thorn bushes mainly at 1600-1725 m (Benson, 1942, 1946; Collar and Stuart, 1985; Stattersfield et al., 2000). It feeds on insects associated with flowering trees (Collar and Stuart, 1985). It is suspected of nesting in holes in tall ‘chimney-stack’ termitaria (Benson, 1942; Collar and Stuart, 1985), and on rafters inside traditional houses in the Yabello area (Collar and Stuart, 1985; Ash and Gullick, 1989; Stattersfield et al., 2000).

Threats: the species is mainly threatened by habitat loss and degradation (Table 7) as a result of increase in agriculture and overgrazing. The establishment of a ranch by the Ethiopian government had especially loosened control and encouraged others to implement their own development projects without due consideration to the conservation importance of the site (Anteneh Shimelis and Sutherland, 2000; Anteneh Shimelis in litt., 2000; EWNHS, 1996).

Conservation: though the Yabello Wildlife Sanctuary (c. 2500 km$^2$) was designated for the protection of the Abyssinian Bush Crow *Zavattariornis stresemanni* and the Swallow, it is not yet gazetted and no conservation action is currently underway in the area (Anteneh Shimelis and Sutherland, 2000). Actually, the signpost on the roadside along the Addis-Yabello highway and the office in town with its extremely demoralized staff are the only remaining reminders of the existence of the sanctuary and the ideals for which it was established.
Abbyssinian Long Claw (*Macronyx flavicollis*)

**IUCN Category:** this species is considered *near threatened* (Table 1; Stattersfield *et al*., 2000).

**Range and population:** the Abyssinian Long Claw is endemic to the highlands of Ethiopia (Table 1), except extreme north and west (Keith *et al*., 1992; Stattersfield *et al*., 2000). The species is widespread but described as uncommon at all of the nine sites at which it was recorded during the Important Bird Areas survey between 1995 and 1996 (EWNHS, 1996).

**Ecology:** it occurs from 1200 to 4000 m (Table 1) and is commonest between 1800 and 2750 m (Ash and Gullick, 1989; Keith *et al*., 1992; Stattersfield *et al*., 2000). It prefers open highland grassland and the tussocky grass of moorlands; it has also once been found nesting in crops (Stattersfield *et al*., 2000; Keith *et al*., 1992).

**Threats:** the species population is declining mainly due to habitat loss and degradation (Table 7; Stattersfield *et al*., 2000; Keith *et al*., 1992; Ash and Gullick, 1985). The major causes of threat include increased cultivation and overgrazing. It is also possible this ground nesting species (Keith *et al*., 1992) might be experiencing significant disturbance as a result of nest site trampling by humans and cattle.

**Conservation:** as described in Table 7, there is little or no conservation action being taken to protect the species. Part of its range falls within some of the National Parks and priority forest areas (EWNHS, 1996) and it is not known what proportion of the species population is benefiting from any conservation action in these areas. Since grazing and cultivation especially in National Parks such as the Bale Mountains and Simien Mountains are relatively minimal, populations of the species in such areas might be enjoying better protection.

Sombre Rock Chat (*Cercomela dubia*)

**IUCN Category:** *data deficient* (Table 1; Stattersfield *et al*., 2000).

**Range and population:** the Sombre Rock Chat is a rare and little known species that occur only in Ethiopia and Somalia (EWNHS, 1996; Stattersfield *et al*., 2000). In Ethiopia, the species is known from the Awash Valley including the Awash National Park and in Somalia there is only a single record of it from the Xeeleh mountains in the north (Stattersfield *et al*., 2000). Almost nothing is known about the status of the population in both countries and it is believed it may have been greatly overlooked owing to its similarity to Brown-tailed Rock Chat (*C. melanura*) and Blackstart (*C. scotocerca*) (Stattersfield *et al*., 2000).

**Ecology:** in Ethiopia, rock and scrub habitats are favored by the species (EWNHS, 1996) in common with *C. melanura* and *C. scotocerca* (Stattersfield *et al*., 2000). There is recent information concerning the status of the species in Somalia (Stattersfield *et al*., 2000).
Threats: nothing is known (Stattersfield et al., 2000).

Conservation: in Ethiopia, there is no either species or habitat specific conservation approach for the species (Table 7). Its presence in Awash National Park may have helped it to enjoy some protection, but to what extent this is effective is not known and even this does not guarantee full protection since populations of the species are known to occur outside the National Park.

Somali Short-billed Crombec (*Sylvietta philppae*)

IUCN category: *data deficient* (Table 1; Stattersfield et al., 2000).

Range and population: the species is in northwest and west Somalia and adjacent parts of Ethiopia where it is believed to be more widespread (Urban et al., 1997; EWNHS, 1996; Stattersfield et al., 2000). It is not known how abundant the species is within its range (Stattersfield et al., 2000).

Threats: at one site in Ethiopia, the species habitat is being altered (Table 7) due to charcoal production and extraction of gum and resin (EWNHS, 1996; Stattersfield et al., 2000). As it appears to be restricted to denser areas of thicket it could be very sensitive to changes in habitat as a result of firewood collection or grazing (Stattersfield et al., 2000). It may also be experiencing some disturbance (Table 7) from browsers such as camels.

Conservation: the species is not benefiting from any kind of conservation in Ethiopia (Table 7).

Abyssinian Bush Crow (*Zavattariornis stresemanni*)

IUCN category: *vulnerable to extinction* (Table 1; Stattersfield et al., 2000).

Range and population: this sole member of a genus is endemic to an area of not more than 5000 km² (Table 1), and is restricted to mainly the Yabello area and its range extends towards Mega further south (Collar and Stuart, 1985; EWNHS, 1996; Anteneh Shimelis and Sutherland in litt., 2000; Stattersfield et al., 2000). Probably responding to changes to its preferred habitat, some birds may have started to colonize better patches in nearby areas (between Yabello and Teltele) where they were not recorded from (Anteneh Shimelis and Sutherland in litt., 2000). Density estimate for the species is expected to be completed in the very near future (Anteneh Shimelis in litt., 2000) but a recent (October 1999-June 2000) extensive survey found the species still to be common especially at the heart of its distribution (Anteneh Shimelis and Sutherland in litt., 2000).

Ecology: the species prefer open, semi-arid areas of short grass savanna with scattered *Acacia* trees, avoiding areas of high altitude and slope both for the purposes of feeding and nesting (Anteneh Shimelis and Sutherland in litt., 2000; Stattersfield et al., 2000; Collar and Stuart, 1985). Habitats with high density of woody vegetation and herbs on the ground are also avoided by the species (Anteneh Shimelis and Sutherland in litt., 2000). The Bush Crow feeds on insects...
that include ants, beetles, maggots of Dung-flies, and caterpillar (Anteneh Shimelis and Sutherland in litt., 2000, Stattersfield et al., 2000; Collar and Stuart, 1985). It was claimed that the species starts to breed in May (Stattersfield et al., 2000; Collar and Stuart, 1985). However, according to an October 1999-June 2000 study of the species, birds had started building nests in March and abandoned them latter, possibly responding to the late onset of the rainy season in an unusually dry year (Anteneh Shimelis and Sutherland in litt., 2000).

**Threats:** the main threat to the species is habitat loss and degradation (Table 7). The claim that the recent change in land use in the area doesn’t have much impact on the species (EWNHS, 1996; Stattersfield et al., 2000) is not acceptable to us. We believe the underlying argument behind such assumption is the relatively high abundance of the species at the center of its distribution and the seemingly ‘harmonious co-existence’ of the species with humans and cattle. These may likely lead an observer staying in the area for a few days, which was how most of the reports on the species were produced, to such a conclusion as there is no time to appreciate the inherent major changes in habitat, which are actually affecting the species seriously. In the absence of past data to trace changes in population of the species and its habitat, it would be very difficult to demonstrate the current status and to predict the future. In addition, if there is a very crude consensus amongst successive reports on the high abundance of the species and there is nothing that helps to compare the degree of ‘commonness’ that is reported by observers, especially if they are widely separated in time, it would be very easy to accept the impression that this species might be doing fine, despite the fact that local human inhabitants are destroying its habitat recklessly. Long-term studies have strongly indicated that the grassland habitat both favored by cattle and the Bush Crow has undergone substantial reduction and is being replaced by dense bushy vegetation as a result of overgrazing, shifting agriculture, and the ban on the traditional use of fire to manage the grasslands (Anteneh Shimelis and Sutherland in litt. 2000).

**Conservation:** same as White-tailed Swallow

**Yellow-throated Serin (Serins flavigula)**

**IUCN category:** downlisted to vulnerable from a previously Endangered status (Table 1; Stattersfield et al., 2000).

**Range and population:** Yellow-throated Serin is endemic to Ethiopia known from the Fentalle Mountain of the Awash National Park, Aliyu Amba Dulecha, Aigaber, Ambokarra, and Melka Jebdu all being in the Shoa province except for the first site (Collar and Stuart, 1985; EWNHS, 1996; Stattersfield et al., 2000). There is no population estimate for the species and it is believed the total may not go beyond 1000 (Table 1; Stattersfield et al., 2000).

**Ecology:** little is known of the species ecology except for its habitat that is briefly described as scattered trees interspersed by thick patches of scrub on rocky hill sides and also grasslands dominated by Cymbopogon with small shrubs including
Alvander lavandula, which is a favorite food (EWNHS, 1996; Stattersfield et al., 2000). It has also been recorded along the valley of a small stream at 1400-1500 m (Stattersfield et al., 2000).

Threats: its habitat is being lost and degraded (Table 7) as a result of fire and cultivation and possibly by grazing pressure (EWNHS, 1996; Stattersfield et al., 2000).

Conservation: only part of the species population is found at Awash National Park and it can be said there is no conservation attempt to protect the species.

Salvadori’s Serin (Serinus xantholaema)

IUCN Category: the species is downgraded from its previous vulnerable status (Birds to watch) to near threatened (Table 1; Stattersfield et al., 2000).

Range and population: as listed in Table 1, the only records of the species so far are from central Harar, northern Bale and central Borena zone in Southern Ethiopia (Stattersfield et al., 2000; EWNHS, 1996; Anteneh Shimelis in litt., 2000). The specific localities where the species was recorded since 1900 include Sheik Hussien, Sof-Omar, Arero Forest, Anferara forest, Mankubsa-Welenoso forests, and Yabello (Stattersfield et al., 2000; Anteneh Shimelis in litt., 2000). It is not known whether the range of the species is expanding or contracting (Table 6). Though the recent record of the species at the Yabello Wildlife Sanctuary (Anteneh Shimelis in litt., 2000) is a new addition to the information on the range of the species, it would be very difficult to establish whether this site is part of the species normal range or occupancy of new habitats as a result of lack of a comprehensive scheme to monitor the species. Owing to the wide distribution of the species in Ethiopia and the very poor ornithological knowledge of the range areas, the species is now assumed to be more abundant than claims in the past (Stattersfield et al., 2000). Yet, extensive surveys conducted in 1996 and 2000 were able to locate the species only once each time (EWNHS, 1996; Anteneh Shimelis et al., in litt., 1996; Anteneh Shimelis in litt., 2000). This indicates that the species is quite rare and its population is quite small contrary to the previous assumption, which has resulted in the down listing of the species in the recent IUCN red list.

Ecology: the species seem to favor scrubby vegetation (1000-1500m), in some cases the vegetation being dominated by Acacia-Commiphora woodland and especially in southern Ethiopia it was recorded in juniper dominated woodlands (Stattersfield et al., 2000; Anteneh Shimelis, 2000). The occurrence of the species in some degraded areas (Stattersfield et al., 2000), including a recent record of the species in a ranch in the middle of the Yabello Wildlife Sanctuary suggests that the species might tolerate habitat disturbance to a certain extent (Anteneh Shimelis, 2000).

Threats: as described in Table 7, the major threat to the survival of the species is habitat loss and degradation resulting from agricultural encroachment/expansion,
overgrazing, deforestation for fuel food and building (Stattersfield *et al*., 2000; Anteneh Shimelis in litt, 2000). At Anferera forest open cast gold mining is a threat to the whole ecosystem while habitats at Shek Husien and Sof Omar might be suffering from the presence of too many pilgrims and tourists (Stattersfield *et al*., 2000). It is open to question to what extent disturbance as a result of high cattle and human density has affected the species (Table 7).

**Conservation:** currently the species is not benefiting from either species or habitat specific conservation actions (Table 7). The site conservation action indicated in Table 7 refers to Arero forest, Mankubasa-Welenso forest, Anferera forest, Yabello Wildlife Sanctuary, which are nominally protected areas where actual protection is scanty (EWNHS, 1996; Stattersfield *et al*., 2000). It is not also known what proportion of the total population of the species is found within these ‘protected areas’.

**Ankober Serin (Serinus ankoberensis)**

**IUCN category:** *Endangered* (Table 1; Stattersfield *et al*., 2000).

**Range and population:** this species which was assumed to be restricted to only to an area of not more than 830 km² area around Ankober, was found to be much widespread both in the central highlands of Ethiopia and further north (Anteneh Shimelis, 1999). The new sites include Kundi, Guasa, and the Simen Mountains National Park (Anteneh Shimelis, 1999). The species might also be found at Mt. Abune Yosef in south Wello. Where it occurs, the species seems to be common and its total population is estimated to be larger than 10000 (Stattersfield *et al*., 2000).

**Ecology:** this gregarious species occurs along the escarpment rim of the Ethiopian highlands in open terrain that includes broken hill tops, near-vertical cliffs, steep, vegetated slopes and earth banks (Collar and Stuart, 1985; Anteneh Shimelis, 1999; EWNHS, 1996; Stattersfield *et al*., 2000). It prefers to perch on lichen-covered rocks, bare earth and short-grazed pasture, and feeds on grasses and herbs (Anteneh Shimelis, 1999; EWNHS, 1996; Stattersfield *et al*., 2000). Breeding takes place between October and February, although it possibly breeds during any season following heavy rain (EWNHS, 1996). A nest was reported found inside a vertical hole underneath an overhanging bank and clutch size was three (Collar and Stuart, 1985).

**Threats:** much of its habitat is well protected because of its inaccessibility to humans, although the habitat in the Ankober area and Menz (Guasa) are under increased pressure from increased grazing and cultivation (Anteneh Shimelis, 1999; Stattersfield *et al*., 2000).

**Conservation:** the Guasa area is well managed by the local community and the population in the Simen Mountains National Park might be enjoying some protection. In all the range areas there is little or no knowledge of the conservation importance of the species especially by the local community.
VIEWS ON DOWN LISTED SPECIES

Salvadoris Serin: It is very important to note that the distribution of the species is extremely patchy and it is highly likely that local populations might be very small making them extremely vulnerable to any kind of threat. There are serious conservation concerns in areas such as Bisidimo, where pesticide sprayed to reduce the impact of pest birds such as Red-billed Quelea (EWNHS, 1996) might be seriously affecting these birds, if not totally eliminating them. Adding to this the fact that there is not any kind of conservation action to protect this species, and there isn’t as such the awareness on their threat status and its gravity, even at the level of conservation organizations, there is no question as to the very grim situation in which we find the species currently and also its future fate. Thus it is very important to establish the exact distribution of the species in the country, how many of them are found at each locality and to what extent they are managing in the face of all the threat, before concluding that the species is less threatened than it was previously assumed.

Shoebill: the exclusion of some range countries by Stattersfield et al., (2000), we preferred to believe, is based on sound evidence, considering their access to literature on the known bird species of the globe. Their decision to reach such conclusion is either by accepting the extinction of populations of the species in these countries, mainly driven by absence of recent records reporting the continued presence of the species in the countries, or there is enough evidence to suspect the accuracy of past reports. The latter is highly unlikely because of absence of any species that is remotely similar enough to cause a mistaken identification and warrant a justified suspicion of a report. In addition, some of the names that reported the sightings are well known in the ornithological literature and did provide very much valuable information on the birds of Africa. If there is enough evidence to validate the former case, then it must be true that the species had experienced a substantial reduction in its range and population provided that the populations in the discounted countries were large enough to significantly affect the global status of the species. If true, this might justify positioning the species in the global red list rather higher. But this was not done, and this may be because the species population is high enough and its distribution satisfactorily wide to keep the species in the lower risk category (Stattersfield et al., 2000).

Prince Ruspoli’s Touraco: reasons stated for the down listing of the species from the endangered to the vulnerable category include that its range is larger than was previously thought, and the species habitat is still not that much affected by human presence. Whatever is added to the species range is not large enough to have added a very high population of the species to result in its down listing. Coming to threats to the habitat, the forests in Borena are not well protected on the ground and they are devastated by humans as any forest in Ethiopia and the situation is getting worse. It is very perplexing to down list a species without the presence of proper conservation action, an assessment impact of such an action, and even in the
absence of huge range extension reports like the Ankober Serin and the Harwood’s Francolin.

**Sidamo Lark**: though Stattersfield *et al.* (2000) claim that the existence of a military training center at the heart of the species distribution may not be a threat on the grounds that, ‘birds were seen displaying above the training soldiers’, we still believe this activity may have caused serious damages to the species population in the area. Without conducting a comprehensive study on the ecological requirements of the species, especially those relevant to the breeding success of the species, the conclusion drawn on the importance of this specific threat is unacceptable to us. It may also have been better if the species had retained its *endangered* status considering absence of any past or present conservation action that may have improved the species situation. Without the existence of a scheme to monitor the species population and without conducting some basic surveys it would be unacceptable to conclude that the species population is declining and also to claim that the population is stable and the species is less threatened than it was previously thought.

**CURRENT PROBLEMS AND FUTURE ACTIONS**

**Information gap**

The main problem that may hinder any attempt to conserve globally threatened birds of Ethiopia is the lack of sufficient knowledge on the basics of their requirements. Table 6 shows that the only complete knowledge we have on the threatened birds of Ethiopia is the name of the countries (as indicated by the + signs) in which they are found. For most of the species the Ethiopian localities in which they occur are more or less well documented, and information on range expansion/contraction is absent for most species except for White-winged Flufftail and Abyssinian Bush Crow (Table 6). In the case of the former one, the three localities (Table 1) which make up the whole of the range of the species in Ethiopia, are almost surely known to be the only sites to find the species in the country since successive surveys failed to find the species in areas of past records and some new seemingly suitable habitats. So it is because of the absence of the species in some sites at which the White-winged Flufftail was known in the past (Taylor, 1998) that we put the -(+) sign to indicate the presence of some information on range contraction but not sufficient enough to validate local extinctions. The Abyssinian Bush Crow case refers to some 'expansion' in its range and this accounts to the observation of the species near Teltale (some 30 km southwest of Yabello) which needs further investigation to establish whether these birds represent 'new populations' colonizing 'new' habitats or already existing birds fleeing from the type locality as a result of change in their habitat (Anteneh Shimelis and Sutherland *in litt.*, 2000). Information on population dynamics is almost non-existent for most of the species and habitat related issues can also be said to be in the category of "unknown" (Table 6). When it comes to the threats the
species are facing, the types and their causes are relatively well documented and the impact of the threats on the species as time lapses had never been an issue that was dealt at any time in the past. So, it should be clearly stated that whatever is known about the rare and threatened birds of Ethiopia is still crude and every refinement work would contribute a lot in guaranteeing the future survival of these species.

**CURRENT CONSERVATION ACTION**

According to Table 7, only 10 species are 'benefiting' from some sort of site conservation program in the country. When we are saying 'site conservation program' we are referring to the national parks, game reserves, controlled hunting areas, wildlife sanctuaries, priority forest areas and etc. in the country. Except for very few, most of these conservation areas exist nominally and proper conservation measure is non-existent. It is because, not all individuals of the species are found within the enclaves of these 'protected areas' and even if they do, there is no evidence that confirms the current conservation system and practice in Ethiopia guarantees the future of these species, that we put the -(+) sign where it is appropriate to indicate the unsatisfactory nature of the conservation action (Table 7).

**WHAT SHOULD THE COURSE OF ACTION BE?**

Using species as building blocks for conservation: species provide an accessible focus to conserve ecosystems by indicating key sites, key habitats and key issues for conservation. Understanding the distribution of threatened birds is a key component in identifying priority sites for conservation, called Important Bird Areas (IBAs). An estimated 20,000 IBAs are identified globally (Stattersfield *et al.*, 2000) and 73 IBAs have already been identified and prioritized for conservation in Ethiopia (EWNHS, 1996).

Globally, 76% of threatened birds occur in forests and 56% suffer from severe fragmentation of their habitat (Stattersfield *et al.*, 2000). About 71.5% of the resident globally threatened birds of Ethiopia occur in the lowland semi-arid habitats of the country (Table 1 and Fig. 1), indicating the conservation importance of these habitats in Ethiopia. Understanding the ecological processes in which these species are involved makes it clear that site-based conservation, although essential, is not always enough to prevent extinctions. As described in the species account section, most of our species have substantial proportion of their population scattered outside protected areas, which limit the ability of the current conservation scheme to protect such species from extinction. Integrating conservation an activity at the landscape scale is often necessary to safeguard ecosystem functions (Stattersfield *et al.*, 2000).
Fig 1 Major habitats where globally threatened birds of Ethiopia are found.

Understanding the root causes of declines in threatened birds allows us to identify the key socio-economic and political drivers of extinction and respond with appropriate action. Such action is urgently required to address the problem of habitat loss, especially that caused by unsustainable selective logging and conversion to agriculture (Stattersfield et al., 2000).

WHICH HABITATS SHOULD WE CONSERVE?

Out of the 21 globally threatened species 15 are found in habitats of semi-arid areas (grassland, shrubland and savanna) while two species depend on wetlands, two species on Afro-montane grasslands, one species in forest and another one cliff-frequenting species (Table 1 and Fig. 1). This clearly shows the importance of habitats in semi-arid regions for the conservation of globally threatened resident birds of Ethiopia.

WHICH ISSUES SHOULD WE ADDRESS?

Habitat loss and degradation is the main cause of endangerment to birds in Ethiopia accounting for the red listing of 17 species (Table 7 and Fig. 2). The second most important threat to the birds of Ethiopia is human and other forms of disturbance such as by cattle affecting 12 of the threatened birds in the country (Table 7 and Fig. 2). Five species are directly persecuted while poisoning and accidental mortality are problems to one species each (Table 7 and Fig. 2).

Most of the threatened species in Ethiopia are poorly known (Table 6). Thus the first stage in the conservation of these species is to conduct surveys and collect good data that will be used to prioritize those species that are at risk of extinction and identify those key factors causing endangerment.
Research is only the first step towards saving threatened species. It is very important to identify and address specific issues that would effectively reduce the pressure and result in a slow down in the decline of the populations of threatened species. This might involve addressing critically important threats in a species specific fashion, strengthening and redirecting the goals and objectives of the current site-based conservation action, and also active management of habitats where threatened birds occur.

**CAN WE CONSERVE ALL THE SPECIES AT ONCE?**

Obviously not, at least not in a very poor country like Ethiopia. The best approach would be to prioritize the conservation needs of our species using a range of criteria that would help to identify those species in need of urgent conservation action. Once this is done the next step would be to prioritize problems and to identify projects (actions) that would help to at least reduce the impact of some of the most important threats.

**WHICH SPECIES SHOULD BE TARGETS OF CONSERVATION ACTION IN THE NEAR FUTURE?**

The 21 threatened birds found within the country’s borders are rare in their own respect and require a deliberate strategy to conserve them. Practical conservation is a digest of several arguments notwithstanding the imperative to find a balance between economical development and biological conservation. While the debate of conserving wild species over ethical, economic and ecological questions rage,
conservationists are all the more required to provide proof and rationale for conserving this or that species of concern.

One method of providing information for practical conservation is prioritising amongst a list of already high rated species or sites. Prioritisation of priorities ensures that the most affected or threatened species or sites receive maximum attention. Prioritisation is an active planning process that requires setting a goal, ranking and listing actions for conservation.

The need for prioritisation process arises from the need to meet conservation and sustainable use goals with limited amount of resources at hand. A prioritised document provides a practical tool that allows budgeting of finances and time to the conservation of a threatened species.

One of the most important requirements in any prioritization process is the availability or access to information. Information on Ethiopia’s birds is generally sparse and lack of adequate data presented a problem in providing the necessary outputs.

**RESULTS OF THE RANK PROCESS**

- **Biological**: on the basis of endemicity, the smallness of their populations and global ranges, the habitat type in which they occur, the species were ranked as described in Table 2. Accordingly, Yellow-throated Serin, Sidamo Lark and Digodi Lark have come out to be the most priority species (Table 4).

- **Threats**: the most important species in terms of the number of threats they are facing and the importance of each specific threat to a species, Shoe-bill, Harwood’s Francolin, and Little Brown Bustard were ranked as the most threatened amongst the 21 target species (Table 8). As can be seen in Table 9, most of the species had scores quite close in value leading to the conclusion that all of them are desperately in need of some kind of study in almost all of the basics that are important for any kind of conservation action.

- **The overall rank process**: due to the fact that the technique we have used is subjective and the weightings that we have attached with the different individual criteria do not have any mathematical justification, we decided to have a range size of ten for the total sums capture species of fairly similar status and the resulting process is summarized in Table 10. The first two columns of the table show all 21 species with the range in which their cumulative scores fall and their rank. Those species categorized under the critical 1 column are those species that require an immediate conservation action and should be the first to receive conservation investment primarily.

This ranking procedure has assisted the categorization of actions. Threatened birds are again priorities by themselves but the requirement here is to define a plan where one threatened bird could receive prior action relative to another. In this
exercise, a threatened bird can be assigned a category according to the rank awarded in the previous procedure. Bird species have been assigned critical 1, critical 2, critical 3, urgent h, urgent m, imp h and imp m action categories. An action category placed higher above another category would receive prior attention as compared to succeeding categories. In this case, it is obvious that a species in critical 1 category would receive pre-eminence over critical 2 and critical 3 categories.

Table 8 Prioritization of globally-threatened resident birds of Ethiopia for conservation based on importance of major threat causes.

<table>
<thead>
<tr>
<th>Species (ordered taxonomically)</th>
<th>Ag</th>
<th>Og</th>
<th>Hc</th>
<th>Pe</th>
<th>Dis</th>
<th>Total</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoebill Balaeniceps rex</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>Lappet-faced Vulture Torgos tracheliotus</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>5</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Taita Falcon Falco fascinucha</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Harwood’s Francolin Francolius harwoodi</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>White-winged Flufftail Sarothrura ayresi</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Rouget’s Rail Rougetus rougeti</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Wattled Crane Grus carunculatus</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>5</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Little Brown Bustard Eupoditis humilis</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>White-winged Dove Streptopelia rechenowi</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Prince Rupoli’s Turaco Tauraco rupolii</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Friedman’s Bush Lark Mirafra pulpa</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Degodi Lark Mirafra digodiensis</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Sidamo Long-clawed Lark Heteromirafra sidamoensis</td>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>5</td>
<td>16</td>
<td>4</td>
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<td>White-tailed Swallow Hirundo megaensis</td>
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<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>5</td>
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<tr>
<td>Abyssinian Longclaw Macronyx filavicolis</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>Sombre Rock Chat Cercomela dubia</td>
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<td>3</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>9</td>
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<tr>
<td>Somali Short-billed Crombec Sylvietta philipae</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Abyssinian Bush Crow Zavattariornis stresemanni</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Yellow-throated Serin Serinus flavigula</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Salvadori’s Serin Serinus xantholaemus</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Ankober Serin Serinus ankoherensis</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>11</td>
</tr>
</tbody>
</table>

Key: Ag=Agriculture, Og=Overgrazing, Hc=Household consumption, Pe=Persecution, Dis=Disturbance with score values ranging from 0 to 5.

“Prioritisation 2” follows the same principle as the earlier exercise with the exception that indices were derived from the difference between a score and the range of the distribution. In this case the range of the distribution is 23 (88 minus 65).

From the above exercise, it is seen that species in the critical categories would profit greatly from studies on their ecology and behavior. It should be noted that species in lower categories are not necessarily “better off”. The prioritization process used here still lacks a number of factors (information) without which it
would always be part of a picture. This goes to say that prioritization is a process and should have a dynamic tendency. It should be reviewed and updated to show current status of the species. Without this ongoing process of refining the status of a species (dependent on input of new information), we will always be making assumptions and have no basis for our knowledge.

**Table 9** A matrix of criteria that prioritizes globally-threatened resident birds of Ethiopia for conservation based on what and how much is known about a species.

<table>
<thead>
<tr>
<th>Species (ordered taxonomically)</th>
<th>Gr score</th>
<th>Pop score</th>
<th>Hab score</th>
<th>Int score</th>
<th>Thr score</th>
<th>Total</th>
<th>Rank</th>
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</thead>
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<tr>
<td>Shoebill <em>Balaeniceps rex</em></td>
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<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Lappet-faced Vulture <em>Torgos tracheliotos</em></td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Taita Falcon <em>Falco fascinucha</em></td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Harwood's Francolin <em>Francolinus harwoodi</em></td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>12</td>
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<tr>
<td>White-winged Flufftail <em>Sarothrura ayresi</em></td>
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<td>5</td>
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<td>Rouget's Rail <em>Rougetus rougetti</em></td>
<td>1</td>
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<td>Little Brown Bustard <em>Eupoditis humilis</em></td>
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<td>4</td>
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<td>1</td>
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<td>White-winged Dove <em>Streptopelia rechenowi</em></td>
<td>1</td>
<td>5</td>
<td>4</td>
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<td>1</td>
<td>12</td>
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<tr>
<td>Prince Ruspoli’s Turaco <em>Tauraco ruesseli</em></td>
<td>1</td>
<td>5</td>
<td>3</td>
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<td>1</td>
<td>11</td>
<td>3</td>
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<tr>
<td>Friedman’s Bush Lark <em>Mirafra pulpa</em></td>
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<td>5</td>
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<td>Degodi Lark <em>Mirafra digodiensis</em></td>
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<td>White-tailed Swallow <em>Hirundo megaensis</em></td>
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<td>Yellow-throated Serin <em>Serinus flavigula</em></td>
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<td>12</td>
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Note: This refers to information compiled on a global range of a species covering issues such as range countries, localities, range contraction/extension; population related issues such as density, total numbers, breeding population, adult juvenile ratio, and trend in population; habitat requirement issues that include availability, foraging requirement, breeding requirement and tolerance to habitat disturbance; intra/interspecific interactions; and threat issues that include type, cause and impact with time. Each component issue receives a score value of 1.
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REFERENCE


SOME PATTERNS OF POPULATION DYNAMICS AND DISTRIBUTION OF SWAYNE'S HARTEBEEST (ALCELAPHUS BUSELAPhus SWAYNEI) IN SENKELE SWAYNE'S HARTEBEEST SANCTUARY

Berhanu Gebre

ABSTRACT

An ecological study of Swayne's Hartebeest (Alcelaphus buselaphus swaynei), an endangered subspecies of antelope, was made from February to December 1999 in Senkele Swayne's Hartebeest Sanctuary (SSHS) located 300 km from Addis Ababa. Data regarding population size, structure, vegetation community utilization, home range and daily activities were gathered in both dry and wet seasons. A direct count method was employed in estimating the population in about 28 km$^2$ of its natural habitat. The total estimate of Swayne's Hartebeest was between 145 in the wet season and 179 in the dry season. Classification of 142 animals in dry season and 123 in wet season indicated different sex and/or age structures for the population. The majority of the population was largely comprised adult and sub-adult females (52.2%) adult and sub-adult males (31.6%). The proportion of the young constituted (16.1%). Herd size altered monthly. The maximum group size observed was 45. Hartebeest's number of groups was largest in wet season in the open plain and smallest in dry season in woody cover. The distribution of Swayne's Hartebeest is found to be influenced by food availability and the presence of human and domestic animals. They were observed utilizing the 3 vegetation communities in both seasons, however, there was more utilization of the Pennisetum Grassland (PG) community (77.2%) in the wet season and 62.5% in the dry season. Locating all groups during counting provided the movement and home range data of both seasons. Minimum Convex Polygon (MCP) method was used to calculate the home range size. Seasonal home range size varied. Wet season home range size was twice larger than the dry season (16 vs. 9 km$^2$). Swayne's Hartebeest activity was recorded at 4 min-intervals for continuous period of 12 hr on two consecutive days every month. About 48.9% of the total time was spent in feeding and 38.6% in resting. There were two feeding peaks, one in the morning and another in the afternoon, and one resting peak in the middle of the day.

INTRODUCTION

Compared to other regions, Africa has the largest number of endemic families and genera of the big games. This high degree of endemism is one of the reasons for African fauna to be so interesting (Delany and Hoppold, 1979).

* Simen Mountain National Park, PO Box 13, Debark, North Gondar
Ethiopia is one of the few countries in the world, which possess a unique and characteristic fauna with a high level of endemicity (WCMC, 1991). Swayne’s Hartebeest (*Alcelaphus buselaphus swaynei*) (“Korkey” in Amharic) is a subspecies of the widespread *Alcelaphus buselaphus*. It occurs in small numbers in only a few areas of southern Ethiopia. Until the early 1890’s, *A. b. swaynei* was widespread throughout Ethiopia and Somalia (Swayne, 1903). Herds of a thousand individuals were observed by Brigadier-General Swayne, who discovered the hartebeests in 1891-92, South of the Golis range of Somaliland, about 200 km from the coast (Last, 1982). Within fifteen years, the tens of thousands that Brigadier Swayne had seen was dwindled to an extent that only about 800 were estimated to have remained (Last, 1982). The rapid decline was due to the rinderpest that swept Africa at the end of the last century. By the early sixties, the only sizable population of Swayne’s Hartebeest was located in the Senkele and Siraro Plains, west of Lake Awassa (Bolton, 1971). At present, *A. b. swaynei* are found only in four localities in Ethiopia, namely, Awash National Park (ANP), Senkele Swayne’s Hartebeest Sanctuary (SSHS), Nechsar National Park (NNP) and Maze Wildlife Area (MWA) (Hillman, 1993) (Fig. 1). Bolton (1973), reported the presence of Swayne’s Hartebeest in Yabello, but according to Hillman (1993), it is now extinct from the area.

According to Lealem Berhanu (1974), ninety hartebeests were translocated to Awash National Park and one hundred and ten to Nechsar National Park in May 1974. The reason for the translocation was the expansion of mechanized farms in Senkele area and the heavily settled pastoralists in the region. The need of regular survey is even more obvious when the population we deal with is an animal, which is in real danger of extinction. Thus, the aim of the study was to determine the current status of Swayne’s Hartebeest.

The horns of hartebeests, carried by both sexes, spread into the wide graceful brackets. They are heavier in the males with more pronounced knobs (Bolton, 1973). The heart-shaped horns that gave the subspecies its name are usually hooked backward. The general color is chestnut and the rump, hindlegs, and lower half of the forelegs are brown. The tail-tuft is black and there is a black stripe extending from the shoulder to just above the 'knee' (Jackson, 1974).

Hartebeests inhabit dry savannas and grasslands (Nowak, 1991). Non-migratory African herbivores like hartebeests satisfy their nutritional requirements within a limited home range by seasonally shifting between habitats and/or by selecting species and/or parts in different seasons.

Reproduction may be markedly seasonal. The young of *A. buselaphus* are born from October to November in South Africa and from December to February in southern Ethiopia (Lewis and Wilson, 1979). The gestation period is about eight months.

Hartebeests are gregarious, living in organized herds (Nowak, 1991). Ungulates rarely range randomly. A number of factors such as season, availability of food,
breeding activity and population density affect home range estimates (Eberhardt et al., 1984).

The status of Swayne's Hartebeest is classified as endangered by the International Union for the Conservation of Nature (IUCN, 1984). Swayne's Hartebeests in SSHS are in greater danger of extinction now than any other time in the past.

Fig. 1 Distribution of Swayne's Hartebeest in Ethiopia (Modified from Hunting Technical Services, 1976).
OBJECTIVE

- To assess the current population size and distribution of Swayne's Hartebeest in SSHS.

Specific objectives

- To determine the current population size and trends of Swayne's Hartebeest.
- To assess the distribution pattern in relation to vegetation communities, livestock and human interference
- To investigate their movement and home range size
- To describe the diurnal activity patterns

DESCRIPTION OF THE STUDY AREA

Location and topography

The study area, SSHS, is located about 300 km from Addis Ababa and about 12 km from the road running between Shashemene and Alaba Culito on the road to Arba Minch (Fig. 2). The area is situated on the Western side of the Ethiopian Rift Valley, found approximately on 7°12’N, 38°17’E. The Sanctuary was established in 1976 with the primary objective of saving the endangered subspecies, Swayne's Hartebeest (Hillman, 1993). At present, about 28 km² of the Sanctuary remains for the hartebeest, as the rest of it was taken over by the peasants living nearby.

Climate

Rainfall at Senkele has a moderately bimodal pattern, typical of the 'Woina Dega' Agro-Ecological Zone of Ethiopia (1700-2700 msl; 600-1200 mm annual rainfall). The three months of dry season, from November to January, is followed by the 'Belg rains' (small rainy season), from April to May, and the 'Kiremt' rains from June to August. During the present study period, however, there was no 'Belg rains', and as a result February and March were taken as part of the dry season.

Soil and geology

The main geological formation in the Senkele area is ignimbrite, which on weathering has given rise to heavy textured, dark sandy loam to clay top-soils, moderately deep to deep on the open plains, but shallower on slopes. Sub-soils vary from gritty, brownish sandy loams to clay (Hunting Technical Services, 1976).
Fig. 2 Map showing the study area (Messana and Bereket Netsereab, 1994).

Vegetation

Messana and Bereket Netsereab (1994) analyzed the vegetation within the Sanctuary based on differences in the species composition and cover of grasses resulting in the identification of three distinct communities (Fig. 3).

Wild animals

In addition to the hartebeests, several other species occur at Senkele. Oribi (*Ourebia ourebi*) was probably very common in the past since Senkele means Oribi in the local dialect (Hunting Technical Services, 1976).
The land use system

In the Senkele plains, the dominant form of land use up to 1940s was pastoralism. In the late sixties, areas of pasture in the area were increasingly brought under cultivation and pressure on remaining pasture was intensified (Messana and Bereket Netsereab, 1994).

There was a serious conflict between the Sanctuary and the State Farm that lies to the west of the Sanctuary, as the hartebeests were raiding the plantations of the bordering State Farms. In order to prevent the damage caused by the hartebeest through crop raiding and trampling, the State Farm employed full-time guards.

MATERIALS AND METHODS

Duration of study

The study was undertaken between February 1999, and December 1999. Quantitative data were obtained on the population size, structure, distribution, home range size, activity pattern and assessment of the impact of local communities living around the Sanctuary, on the dry and wet seasons. A reconnaissance survey of the Senkele Swayne’s Hartebeest Sanctuary was conducted covering most of the area.

Fig. 3 Map showing the vegetation communities of the Sanctuary.
Dividing the study area

The entire study area was divided into five blocks with artificial and natural boundaries. The distance between consecutive transects varies depending on the vegetation cover. A distance of 1 km between block 1 and 2, and 0.8 km between areas of the rest (blocks 3, 4 and 5) was taken. Block-1 and 2 had less acacia cover and the other blocks were relatively denser with acacia and other vegetation on the eastern side.

Population estimation

Total counts were made using direct count method based on silent detection to estimate the population size as was adopted by Wilson et al. (1996). The counting was carried out using unaided eyes and/or binoculars, while on foot and/or on horseback, four times during the dry season and four times during the wet season. The censuses were conducted when the Swayne's Hartebeests were most active (9:00-11:00 AM) in the morning and (3:00-5:00 PM) in the afternoon following the method of Lewis and Wilson (1979).

Sex and age structure

During the counting, detailed observations of the entire herd were made, which enabled to categorize them into their respective age groups. The categories used are Calf, Juvenile, Sub-adult and Adult and the sex of each subadult and adult individual was identified.

Clues to age and sex were provided by body size, horn sizes, pelage and above all the primary sexual characteristics such as the presence of penis sheath, scrotum or udder as described by Wilson et al. (1996) for different animals.

Group size

During each total count, the location of every group of Swayne's Hartebeests was plotted on the map of the area. Such method was applied by several workers on other animals (Hillman, 1987).

Distribution and vegetation type utilization

To assess the distribution pattern and the diurnal utilization of each vegetation type, data from the breakdown of the total counts were used. The location of each herd and the vegetation type at each location was recorded. This could give dry and wet seasons distribution and vegetation type utilization of each herd as in Norton-Griffiths (1978). Taking group sightings as scores with respect to habitat types and comparing their frequencies to the relative availability of vegetation types, it was possible to detect habitat utilization.
Movement and home range

Data on movement and home range size were obtained from the ground observation of all the groups of Swayne's Hartebeest. All the groups were located two times in 24 hours for eight months following the method of Wilson et al. (1996). As used in Pennycuick (1975), the technique used in mapping home ranges was by checking the movement and location of the animals. The location of the animals on the ground was approximated on the map and then transferred to a working map of the same scale (1:50,000) with 1 km\(^2\) grids as was adopted in Murray (1982).

The size of home range for the animal was calculated by the Minimum Convex Polygon (MCP). The boundary of the home range was obtained by connecting the most peripheral locations where the members of a group have been seen, following the method of Massei et al. (1997).

Diurnal activity pattern

The method used to record the activity pattern of Swayne's Hartebeest followed the one described by Rollinson et al. (1956) for the study of Zebu cattle. The technique involves classifying the behavior into a number of specific activities and noting which one is being carried out in a given time. To obtain information on diurnal activity pattern particular hartebeests were observed for extended period of time 6:00 to 18:00 hours two days per month at four minute interval for eight months, as described by Eberhardt et al. (1984). The diurnal activities were recorded under the headings: 'feeding', 'standing', 'lying', 'walking' and 'other activities.'

Assessment of the impact of the local people

The method used for assessing impacts of the local people included meeting elderly people who are respected by their community, any member of the community, local officials, and warden and scouts of the Sanctuary.

RESULTS AND DISCUSSION

Population estimation

The highest total number of hartebeest counted was 179 in December 1999; the lowest number was 145 in July 1999 (Fig. 4). Averages of 150 and 173 hartebeests were counted during the wet and dry season's censuses respectively. There was no marked difference in the total number of hartebeests counted in the dry and wet season. However, there is slight increase in the dry season compared to the wet season (Fig. 5). This may be due to the fact that the animals give birth mainly in the dry season, December to February (Messana and Bereket Netsereab, 1994). In addition it may be accounted for by the random distribution of the population all over the area due to the abundance of food resources during the wet season that may have made counting more difficult.
Some counting blocks had higher numbers of hartebeests than others depending on the habitat quality, influence of human activities and livestock distribution. The highest average number of hartebeest counted was 45 in block-3 and the lowest number was 13 in block-1 (Fig. 6).

**Population trends**

In the present study, only an average of 161 hartebeests were estimated (Fig. 7).

![Graph showing monthly population estimation of Swayne's Hartebeest in 1999.](image)

**Fig. 4 Monthly population estimation of Swayne's Hartebeest in 1999.**

![Graph showing comparison of Swayne's Hartebeest counted in both seasons.](image)

**Fig. 5 Comparison of Swayne's Hartebeest counted in both seasons.**

Near the end of the last century, vast numbers of Swayne's Hartebeest occurred in Somalia (Swayne, 1903). Shortly afterwards these stocks were decimated by rinderpest and the race is now extinct in Somalia.

recorded a total of 442 animals. By 1981, 1020 animals were counted (Solomon Yirga, 1981) and Fekadu Kassaye and Messana (1984) estimated about 1773 hartebeests. The population size at Senkele had increased to 2379 animals in 1988 (Messana, 1993). Following the downfall of the Derge regime in 1991, the hartebeest population has been drastically reduced through systematic poaching and competition with livestock to an estimated 626 animals. According to Leykun Abunie (1996), the population size of Swayne's Hartebeest had continued declining and a maximum of 300 hartebeests were estimated in the Sanctuary.

Fig. 6 Comparison of Swayne's Hartebeest in each counting blocks.

Age and sex structure

The age and sex of 142 and 123 individuals in the dry and wet seasons respectively was determined. On the average, 83.8% of all the Swayne's Hartebeest observed were comprised of adults and sub-adults while 16.1% were young individuals. Among the adults and sub-adults, females constituted 52.2% while adult and sub-adult males constituted 31.6% of the population observed. Number of adults, sub-adults and youngs varied in the seasons. Adults, sub-adults and youngs were greater in number in the dry season than the wet season (Fig. 8). The small proportion of young Swayne's Hartebeest indicated the presence of problems and decreasing population.

Sex ratio

The adult and sub-adult sex ratio shows that there is an unequal sex ratio in the population, the females being more numerous than the males. The sex ratio for the adults was 1:1.5 and for the subadults it was 1:1.9. The structure of individual herds varied. The male to female ratios found in the Senkele population of Swayne's Hartebeest was different from what was found by Bolton (1973) in the Nechsrar population (103 animals) of the same subspecies, which was
approximately 1:5. A similar study made by Messana (1993) on the Swayne's Hartebeest at Senkele showed an equal sex ratio of 1:1.

![Population trend of Swayne's Hartebeest in SSHS (1972-1999).](image)

**Fig. 7 Population trend of Swayne's Hartebeest in SSHS (1972-1999).**

**Group size**

The mean group size was highest in February and lowest in August (34.4 and 11.5 respectively). Distribution of individuals aggregated in groups of different size differed among habitats in each season. In the dry season, the average percentage distribution of individuals in groups observed in the woody cover was greater (72.3%) than the average of the wet season in the same habitat (15.8). The plain was characterized by carrying the highest proportion of the number of hartebeest individuals in the wet season (84.2%). The largest total number of groups recorded were 13 in August, which is in the wet season, and the lowest 5 in February, which is in the dry season. Kingdon (1982) reported this fact in which most *Alcelaphinae* form large aggregations during the dry season. As the wet season begins, the large groups of hartebeests were split into smaller groups and distributed widely in the open plain. This is in agreement with observations made by Yakub (1999) for Hunters' hartebeest (*Damaliscus hunteri*).

**Distributions and vegetation type utilization**

Use of the habitat types available to Swayne's Hartebeest varied with season. 62.5% of the hartebeests utilized the PG community in the dry season, and 77.2% of hartebeest utilized the same vegetation community in the wet season. The P2 community was utilized almost twice as much more in the dry season (Fig. 9). The reason for this could be probably most of this vegetation community is found in the woody cover which probably help the grass not to be dry and thus be more palatable. Feeding on this vegetation community in the woody cover may help to
over come the heat in the dry season which is important to conserve body water lose that can be additional reason for more utilization of the P2. The distribution and utilization of different habitats by large mammals can be determined by climatic condition (Kutilek, 1979).

![Fig. 8 Number of Swayne's Hartebeest in each age group during dry and wet seasons.](image)

**Movement and home range**

The proportion of home range, which is utilized, is considerably greater during the wet season (16 km²) because of the availability of palatable grasses all over the Sanctuary at this time of the year. In the dry season, when the plain grasses are dry, the hartebeest tends to occupy only the part of its home range in close vicinity to Borena Mountain in the woody cover, which is about 9 km² (Fig. 10). However, during the dry season, when the people and livestock migrate, the Swayne's Hartebeest move out of the Sanctuary to the fallow area in the State Farm (Fig. 11). From this, it is possible to state that without the people and livestock, Swayne's Hartebeest could occupy a wider home range area than expressed in Fig. 10. The wet season home range area also would have been larger than 16 km² if the influence from people and livestock could be avoided.

**Diurnal activity pattern**

On the average about 48.9% of hartebeests day time were spent in feeding. This is also evident in Fig. 12, which shows the various activities according to the time of the day. The feeding may take place at all hours but there is a drastic reduction in feeding activity between 1100 and 1400 hours. There were two distinct peaks in feeding, one in the early hours of the day light between 0700 and 1000 hours, and another in the afternoon between 1400 and 1800 hours. The feeding activity drops to a slow rate before the Swayne's Hartebeest stand or lie down.
ASSESSMENT OF THE IMPACT OF LOCAL PEOPLE

The following factors affect the status of Swayne's Hartebeest in the area.

a) Destruction of habitats

It is clear that destruction of the habitat, especially in the last eight years, has been the prime cause of reduction of the range and number of Swayne's Hartebeest. According to Bolton (1971), the hartebeests were occurring in an area of about 200 km$^2$ where there was an undulating grassland and acacia savanna. However, some of this area has been taken over by the State Farms and individual farmers and the total of this area has diminished to about 28 km$^2$ at present.

b) Disturbance

As observed in the present study, up to December 1999, settlers from the surrounding farmer's associations and other areas have constructed about 900 huts inside and on the border of the Sanctuary. Leykun Abunie (1996) in his survey reported the establishment of 277 new huts in SSHS.

c) Livestock abundance

The number of livestock in the area during this study was by far greater than what was estimated in other previous studies. The data obtained from Siraro Woreda Agricultural office (1999) shows that there are about 52263 animals. Messana and Bereket Netsereab (1994) estimated 24868 animals. The comparison of the two data showed the number of livestock increased by 47% within 4 years.
d) Hunting

On several occasions, rifle shots were heard around Borena and Lalima hills probably fired at Swayne's Hartebeests. On different occasions, men armed with rifles were observed moving into the Sanctuary. Hunters were observed selling meat of Swayne's Hartebeest at Bilitto Market, located about 18 km from the Sanctuary (Pers. Comm.).

From discussions made with the local farmers it became clear that the damage caused by the hartebeests on their crops was considered to be the reason which forced them to poach. In the wet season, farmers must keep continuous evening vigils from very small huts constructed over their maize crop farm to prevent damage by the animals. Generally, the local people dislike the hartebeest and want to eliminate them from the area. They believe that the elimination of Swayne's Hartebeest from the Sanctuary enables them to take over the Sanctuary for farming as well as grazing land for their livestock.

Spotted hyena frequents the whole of the Swayne's Hartebeest habitat and the surrounding area in large numbers. Every night the sound of whooping hyenas were heard and their feces were found in the Sanctuary, particularly in the dry season.
seasons. Common jackals were repeatedly observed in areas where Swayne's Hartebeest frequent and said to kill the Swayne's Hartebeest calves and domestic animals in the area.

Fig. 11 Movement of Swayne's Hartebeest out of the Sanctuary.

e) Predation

CONCLUSIONS

During the dry season, resources were scarce and the animals showed restricted distribution in the woody cover. As the wet season progressed, however, the animals were scattered in the open plain where the resources were abundant. Based on these, it is possible to conclude that the vegetation type for food and shelter is decisive to determine the distribution and vegetation type utilization of the hartebeest.

Comparatively larger group sizes were recorded during the dry season when large percentages of animals were observed on the woody cover. The largest mean group size was recorded on the woody cover in the dry season.

The time devoted to feeding was highest in the early morning and the late afternoon hours and it was minimum in the middle of the day. On the contrary, standing and lying were highest in the mid-day. The activity pattern of all mammals is adapted to their daily mode of life. It may be influenced by wide range
of factors such as food availability, climatic conditions, nutritive demand and protection from predation (Delany and Happold, 1979).

![Graph showing activity variations of Swayne's Hartebeest during daylight hours.]

**Fig. 12** Variation in activities of Swayne's Hartebeest during day time.

The fact that the number of Swayne's Hartebeest was found to decrease steadily after 1991, since the changeover of government, showed that their population is not building up again in such circumstances. The present study showed an average of only 161 individual Swayne's Hartebeest in the area. Compared to the previous population estimates, for example, 2379 individuals by Messana (1993), the present number is alarmingly too low. The reason for their low numbers is thought to be mainly the lack of space and human harassment. The small proportion of the young of Swayne's Hartebeest indicated the decline in population and therefore the presence of a problem in the area.

**RECOMMENDATIONS**

Immediate protective steps for the Sanctuary must be accompanied by measures, which improve the living standard of the local people, without further disrupting the environment. Some of the measures suggested are:

- Providing farm and grazing land from the State Farm which is left uncultivated at present and keeping them away from the Sanctuary.
- Prohibiting farming, grazing and construction of huts within the Sanctuary.
- The boundary of the Sanctuary should be re-demarcated and the sides bounded by the local people should be fenced.
• The Sanctuary should be up-graded to a park level

• When present in large numbers, Spotted hyenas (*Crocuta crocuta*) and common Jackals (*Canis aureus*) can cause a serious Swayne's Hartebeest mortality. Therefore, their numbers should be kept under control until the hartebeest population reaches at the carrying capacity of the Sanctuary.

• It seems that the SSHS has the habitat, which is most preferred by the Swayne's Hartebeest. Therefore, efforts to stabilize this population in this location should be taken as one of the solutions for their survival in the future.

• The participation of local people in design, planning, implementation and evaluation should be encouraged

ACKNOWLEDGEMENT

I owe my deepest gratitude to my advisor Dr. Solomon Yirga for his extremely valuable guidance and advice without which this research project would not have achieved its goal. I would like also to express my special appreciation to Prof. Afework Bekele and Dr. Assefa Mebrate for their valuable advice and encouragement during my fieldwork. I wish to thank the staff of the EWCO, in particular, Ato Tesfaye Hundesa (General Manager), for the permission to work in Senkele Swayne's Hartebeest Sanctuary (SSHS), and Ato Getenet Wondimu and W/r/t Almaz Assefa for their encouragement and help. My thanks go to the staff of SSHS, in particular, Ato Gudesa Leffe for his kind help in the field and for allowing me to use the Sanctuary facilities including the car.

My special thanks are due to the Amhara National Regional State for allowing me to pursue the MSc. program. I wish to thank the School of Graduate Studies and Department of Biology of Addis Ababa University for facilitating my work.

I also thank all those people who assisted me in one way or the other during my study period, in particular, Ato Zelalem Assefa (National Museum) for providing GPS (Global Positioning System) and my friends Sisay Bekele, Leuel Teka, Ahmed Idris, Abebe H/Mariam and Bekele Bahiru.

Finally, most of all I express my gratitude, respect and love to my wife, Mulu Nibret for her consistent support and encouragement throughout the study period.

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WALIA IBEX: A REVIEW OF ITS POPULATION TREND AND CONSERVATION STATUS

Berihun Gebremedhin*

ABSTRACT

The Simen Mountains National Park comprises an array of unique biodiversity including flagship species such as the palaeartic species, Walia Ibex (Capra ibex walie), which is endemic to the area. The presence of this species is of vital importance to this protected area. Past and present population trend of this species is reviewed. The relevance of Walia Ibex for the conservation and preservation of the National Park, in particular, as well as for the whole ecosystem of the Simen Mountains at large is described. The present threats posed by man upon this unique animal such as habitat destruction and disturbance, poaching, agricultural expansion, new settlements that have blocked the movement of Walia Ibex and other anthropogenic factors are described. Possible solutions to mitigate the prevailing threats and ensure the longterm conservation and survival of the species are forwarded.

INTRODUCTION

Many nations accept the desirability of protecting outstanding examples of their natural heritage to contribute for the protection of natural resources and conservation of the biological diversity of the world (MacKinnon et al., 1986). Realizing the needs of conserving and protecting its biodiversity, Ethiopia has become one of the nations of the world that have ratified the Convention on Biodiversity. The country started its wildlife conservation and development program in 1965. The establishment of this program led to the immediate gazettment of two national parks, namely, the Awash National Park and the Simen Mountains National Park in 1969 (Andeberhan Kidane, 1982; Hillman, 1993).

Simen Mountains National Park is one of the world's biological treasures in its species diversity (Hurni and Iva, 2000), despite the fact that it is the smallest national park in Ethiopia. The famous and distinct species include Walia Ibex (Capra ibex walie), Ethiopian Wolf (Canis simensis) and Gelada baboon (Theropithecus gelada). Very recently another unique subspecies of the bushbuck, Menilik's bushbuck (Tragelaphus scriptus meniliki) has been reported to occur in Simen (Endalkchew Teshome, 1999).

The park has very diverse habitats, the mountains rising to over 4500 masl. The altitudinal difference ranges between 1900-4543 masl at Ras Dashen, with

* Amhara National Regional State Agricultural Bureau, Simen Mountains National Park, PO Box 13, Debark, North Gondar.
vegetation gradients varying from mundane forest to Afro-alpine type of vegetation, which consists mainly of *Helichrysum* spp, alpine grassland on the highest altitudes. When viewed in terms of habitat consideration in Reserve Design, the park represents wide varieties of altitudinal bands.

Owing to its rugged nature of topography, many gorges, crest and precipices are still beyond the reach of, and unexplored, by scientists. In the meantime, considerable anthropogenic problems are threats to its diversity and natural beauty. Forest clearance by the expanding population, poaching, and overgrazing has been changing the natural state of the park. Upland cultivation has also been instrumental for the change and disturbance of the ecology of flagship species such as the Ethiopian Wolf (*C. simensis*).

Human and livestock interference in protected areas of Ethiopia reached an alarming stage immediately after the change of government in 1991 and 1992 when lawlessness prevailed in many parts of the country (Shibru Tedla, 1997). However, this situation was common in Simen even before, as it was a frontline and battleground from 1985 to 1991. During these period wild animals especially Walia Ibex and other ungulates such as the Klipspringer and Bushbuck were the main targets of the armed soldiers and local people. The Walia ibexes were being slaughtered for use as source of meat, forests were cleared, settlements were established in areas previously abandoned involuntarily, and grazing livestock in the park became commonplace. Increasing livestock and human population pressure coupled with poor land use has led to a drastic reduction in numbers of many of the species in Simen Mountains. Some forms of wildlife such as Ethiopian Wolf (*C. simensis*) and other carnivores are bound to be lost forever.

Many gentle slopes inside and outside of the national park, which might have been ideal habitats and were roaming by Walia Ibex long time ago have now turned into cultivated lands and hence reduced the traditional movement of the species. Currently, the construction of the new road alignment at higher altitudes, which is only tens of meters away from the edge of the escarpment at some areas, has disturbed the movement of certain flagship species like the Walia Ibex (*Capra walie*). Moreover, it has also caused considerable damage on the natural habitats of the Ethiopian Wolf (*C. simensis*).

The Walia Ibex and its relevance for the conservation and development of the Simen Mountains National Park

A number of biological, physical and cultural principles govern the establishment of protected areas in a given ecosystem. The major types of habitats that support biologically distinctive communities would get higher consideration. In selection of a protected area, ideally the area should have all altitudinal gradients from snowline to adjacent lowlands, so as to maximize diversity. This will also ensure the integrity of the entire watersheds. Moreover, high emphasis is given to wetter
areas, which are likely to hold greater biodiversity than dried areas (Mackinnon et al., 1986).

The Simen Mountains National Park, despite its smallness in size, fulfills these criteria, which enables it to be selected as protected area that needs utmost priority for conservation. Various biological and physical resources can be mentioned as reasons for the establishment of National Park in Simen Mountains. The area has a rich natural biodiversity having altitudinal successions of flora and fauna, and many endemic species of which the Walia Ibex has become a national symbol (Humi, 1986; Humi and Ludi, 2000).

Selection of protected areas also considers the key species they harbor for many reasons. First, key species identifies areas, which require urgent protection. The Walia Ibex, being an endemic to Simen and as a threatened animal representing the species, was considered as a species that need more urgent action.

Secondly, as a flagship species of the park, it has also contributed in evaluating the effectiveness of the park management. Fluctuation of the population in the past three decades have been helping the park management and other concerned bodies to undertake, devise and strengthen management measures.

Thirdly, Walia Ibex as a focal point of the Park has attracted the attention of conservationists, scientists, politicians and the local people. This flagship species has a tourist appeal as compared to other wildlife as it is unique to the area. The native people have understood the biological and tourist value of this unique animal in their native land. It has attracted many visitors and they have benefited to some degree, although the magnitude of the benefit is not high. Local people may not appreciate the geographical features of the area. However, they have understood the global importance of the Simen through the Walia Ibex, because this species is found only in this area and not in any other place of the world. Hence, because of the presence of this species awareness has developed among the local people. They now know that undertaking any ecologically unsound interference that disrupts ecological processes and natural beauty of the area is illegal. Considerable number of people from the communities has been working for the conservation of this species and through it for the preservation and protection of the whole national park.

Scientific and traditional views on Walia Ibex

A member of the sub-family Caprinae, Walia Ibex is the only representative species of the Palaearctic Ibex in Ethiopia (Haltenorth and Diller, 1993). It was first described by Rüpell in 1835 (Nievergelt, 1981). According to Nievergelt (1981), Walia Ibex migrated to Simen during the ice age. However, the local people's view on the introduction of Walia Ibex is quite interesting and the time (period) when they consider the species was introduced to Simen is very recent. According to local oral tradition especially the religious belief, Saint Yared brought Walia Ibex from Jerusalem and used them to carry the holy books. The other
legend on this point is that the nine Saints from Syria introduced the Ibex to Simen. This is the Christian narrative about Walia Ibex. Nievergelt (1981) emphasized that Walia Ibex has a particular significance on the mental image of the local people of the Simen as it is the case on the ibexes of mountains of Europe.

Although many authors argue and consider Walia Ibex as a close relative and subspecies of the Alpine Ibex (Capra ibex) and the Nubian Ibex (Capra ibex nubiana) (Nievergelt, 1981), this animal seems to have distinct morphological and ecological characters. However, detailed scientific and taxonomic study is needed to determine its status as a unique species.

**Habitats and human settlement**

Walia Ibex inhabits very steep and rocky habitats along the escarpment of the Simen Mountains National Park. The current distribution of the species is confined to a narrow belt of escarpment stretching from west (around Ras Amba) to east (Mt Buahit) and then proceeding south (east facing escarpments towards Janamora). It frequents mainly steep sloping habitats above 2400 masl. It has also been frequently observed in plateaus of higher altitudes where Helychrisum spp. and Lobelia are dominant.

Unlike other high mountainous areas of Africa (Delany and Happold, 1979), the Simen Mountains are densely populated. More than 30000 inhabitants live in and around the Park of which about 11000 are found in the Park (Humi and Ludi, 2000). The high number of human population has resulted in accelerated degradation of natural resources. The survival of the Walia Ibex over much of its potential habitats has long been threatened by poaching and agricultural expansion to fertile upland forests.

**Conservation status**

After an alarming decline, the Walia Ibex population showed high increment before two decades and had reached a level of 400 (Nievergelt, 1981). Compared to the population size estimated before the establishment of the National Park (150 individuals), this number indicates that the population of this species had shown a promising increase over the years. However, as this species is the only viable and existing population in the world, the number is still low. According to the theory of island biogeography, small populations of species inhabiting small and fragmented habitats are highly vulnerable to extinction due to various ecological and genetic factors.

A 'biological island' will lead to a decrease in species diversity. The number of species that a reserve can hold at equilibrium will depend on its size, its distance from other areas of similar habitats and the dispersal power of the species concerned. Local extinction of Walia Ibex in areas isolated by the establishment of small villages and market centers like Arquazye is inevitable. Hence, the size of the reserve area (the National Park) affects whether particular species such as the
Walia Ibex can maintain self-sustaining populations within the National Park, and how many species the park can maintain. Conservation and ecological geneticists argue that a minimum of 500 (some say 250, MacKinnon et al., 1986) animals is required to conserve a given species for a long term, whereas an effective population size of 50 individuals are needed for a short term conservation planning. Taking this into consideration, endemic species such as the Walia Ibex need priority attention of conservation. The Simen Mountains National Park can be considered as a small island surrounded by lowlands with a number of anthropogenic pressures acting upon it. Due to possibilities of epidemic diseases, droughts or other catastrophic events, the present population of Walia Ibex cannot be preserved in the long run and the population may not be viable if the areas around the park are altered in such a way that movement of the Walia ibexes is blocked.

The three specific objectives of conservation as presented in the World Conservation Strategy are: maintaining essential ecological processes and life support system; ensuring that any utilization of species and ecosystem is sustainable; and preserving genetic diversity. The definitions and objectives of the strategy are now widely accepted, as it is central thesis of the interdependence of conservation and sustainable development. The challenge, however, is to develop the tools - the policies and the methodologies to apply them to implement the strategy.

Stemming from the third objective, Hurni (1986) has recommended the following:

- The Simen Mountains National Park must be viewed in a spatial relationship within a much larger area. Natural wildlife corridors that enable the animals to disperse from the park are of vital importance for the unique animal life of the park;
- Establishment of wildlife corridors along escarpment ranges to include animals living in different altitudes and habitats;
- Prohibition of hunting in the park, so that animals learn to accept man as a predictable and harmless disturbance and start to utilize habitats in the vicinity of man's activities;
- Exclusion of free ranging domestic goats from the ranges of the Walia Ibex so as to avoid possible hybridization between Walia Ibex and domestic goats;
- In view of the persisting human impact on the wildlife in the park, the capture of several ibexes and their transfer to a zoo should be undertaken.

The periodic increase in the Walia Ibex population is shown in Table 1. Many habitats in Simen Mountains at higher altitudes are ideal habitats for the Walia Ibex. It is expected that many individuals of the species once roamed these mountain chains and escarpments outside of the national park. However, long time settlements in the area have reduced and/or exterminated those portions of the
populations. Concerted effort on the conservation and protection of the National Park coupled with the inaccessibility of the landscape in which they live has allowed for the increase of the remaining population of the species in the park.

The current situation has shown a slight improvement for Walia Ibex, while many highland ungulate species such as Duiker and Bushbuck are at risk. The population size of the flagship species has increased since 1994 and its distribution has expanded especially towards the eastern and southern parts of the mountain chains. However, the western part of the park still entertains few numbers of ibexes than the central and eastern part.

There are a number of intrinsic and extrinsic factors that can potentially influence and impede the growth of ungulate populations. These factors include competition for forage, predators, diseases and parasites, accidents, behaviors and genetics. The fluctuations in population numbers in animals are normally attributable to changes in the availability of enough space, food and cover, climate severity, predation and competition. Detailed study of the presence of these parameters and their effect, as limiting factor for the population of Walia Ibex, has not been conducted. However, accidents are viewed as an endemic but relatively infrequent source of mortality in Walia Ibex. It can be an almost instant killer when it occurs by chance. There are some cases of deaths of Walia Ibex because of accidental falling from steep cliffs.

Challenges facing the protected area

- Although adequate measures have been taken to reestablish and strengthen the national park, the rapid increase in the human population and the concomitant increase in agricultural settlement threaten the future of the area;

- The increase in agricultural settlements has not only claimed land that has been traditionally used by important highland wildlife species, but also blocked important movement and migratory routes into dispersal areas for most wildlife. This blockage of important routes is a serious threat to long term survival of the wildlife and the national park at large;

- Poaching and trapping are further serious threats that could lead to the near extinction of some of the important large mammals;

- Settlement has been increasing mainly occurring in marginal areas which have traditionally been used for wildlife grazing and which are not suitable for agricultural activities;

- The growth of tourism in the area is both an advantage and a peril to the well being of the National Park. Although development and investment on tourism is an idea that needs encouragement in order to utilize the benefit derived from it for the economic development of the local people and hence the nation, the temptation of sacrificing the natural resources for the sake of benefit should be avoided;
The construction of the new road has disturbed the natural habitats of the Walia Ibex, Ethiopian Wolf and other fauna and flora of the park.

Population trends of the Walia Ibex

Population census of the Walia Ibex by simultaneous count carried out from 1969 to 2001 is given in Table 1. The data shows that there was a rapid increase in the population size until 1983 while there was a decrease until 1994. Relatively low population was counted in 1994 as compared to 1983. There was also a difference in the population of ibexes counted inside and outside of the National Park during this period. Most animals counted in 1994 were found outside of the National Park, whereas the population census recorded in the years later show an increase of the population inside the park.

Table 1 The number of Walia Ibex inside and outside of the SMNP in different years.

<table>
<thead>
<tr>
<th>Year</th>
<th>Inside</th>
<th>Outside</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1969</td>
<td>150</td>
<td>50</td>
<td>200</td>
</tr>
<tr>
<td>1976</td>
<td>210</td>
<td>75</td>
<td>285</td>
</tr>
<tr>
<td>1983</td>
<td>280</td>
<td>75</td>
<td>355</td>
</tr>
<tr>
<td>1994</td>
<td>95</td>
<td>135</td>
<td>230</td>
</tr>
<tr>
<td>1995</td>
<td>172</td>
<td>98</td>
<td>270</td>
</tr>
<tr>
<td>1996</td>
<td>270</td>
<td>80</td>
<td>350</td>
</tr>
<tr>
<td>1997</td>
<td>--</td>
<td>--</td>
<td>429</td>
</tr>
<tr>
<td>1998</td>
<td>311</td>
<td>--</td>
<td>352</td>
</tr>
<tr>
<td>2001a</td>
<td>416</td>
<td>173</td>
<td>589</td>
</tr>
<tr>
<td>2001b</td>
<td>416</td>
<td>98</td>
<td>514</td>
</tr>
</tbody>
</table>


Its former habitats probably include all the mountain chains north of the National Park around S'ki, Walia Kend and the vicinity of Ras Dashen. However, due to the rapid increase in human population around these areas, the Walia Ibex population in these areas has been exterminated. It is presumed that large areas of the escarpments at Simen Mountains have been ideal habitats for Walia Ibex. However, the Ibex has abandoned these escarpments long time ago possibly because of the heavy hunting pressure and agricultural expansion to upland cultivation. According to Humi (1995) the estimated surface area of Walia Ibex habitats, both actual and minimum required, inside and immediately outside of the Park shows that large size of the area are found inside than outside (Table 2). However, despite larger area size, the population Walia Ibex was lower inside as compared to the area outside of the National Park in 1994, although this is reversed at present. Moreover, the minimum requirement for additional prime protection Zone is two-fold inside than outside.

Table 2 Estimated surface area of Walia Ibex (Capra walie) habitat (actual and minimum required) inside and immediately outside of the SMNP.

<table>
<thead>
<tr>
<th>Area (in ha)</th>
<th>Actual</th>
<th>Minimum required</th>
<th>Actual</th>
<th>Minimum Required</th>
<th>Actual</th>
<th>Minimum Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2300</td>
<td>5500</td>
<td>900</td>
<td>2800</td>
<td>3200</td>
<td>8300</td>
</tr>
</tbody>
</table>

Composition of population density was determined for the above census, based on the estimated actual habitat available. The population density of Walia Ibex has shown a progressive increment in the core area of the park compared to the area outside of it. In 1994, the population density outside was four-fold than inside. In the following years the trend was reversed. Currently, the population density inside the park is lower than outside of it as a result of the increase of ibexes (Table 3).

Table 3 Population size and density of Walia Ibex inside and outside of the National Park (source as above).

<table>
<thead>
<tr>
<th></th>
<th>Population Size</th>
<th>Population Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inside</td>
<td>95</td>
<td>172</td>
</tr>
<tr>
<td>Outside</td>
<td>135</td>
<td>98</td>
</tr>
</tbody>
</table>

CONCLUSION

The Simen Mountains National Park has been included in UNESCO's list of a World Natural Heritage Site in danger. This is because of the existing human pressure (hunting, forest destruction, intensive over-grazing, expansion of upland cultivation and ecologically unsound road construction and others factors), which has resulted in the dwindling of many of its unique biodiversity (such as the Walia Ibex and the Ethiopian Wolf), and natural beauty. According to previous reports, the population size and density of Walia Ibex and Ethiopian Wolf were very low. Currently, the Walia Ibex population in Simen Mountains - the only world variables and representative population, has showed a slight increment since the past decade. However, its number is still low. More effort is needed to mitigate the current anthropogenic problems and understand the requirement of the species. The need for human intervention in the form of harvest manipulation should be minimal. In general, the population can increase dramatically if the major limiting factors are identified, well studied and removed.

REFERENCES


Endalkachew Teshome (1999). *Simen Mountains National Park, Ethiopia; Conservation values and their relevance to ecotourism*. MSc Dissertation. School of Agricultural and Forest Sciences, Univ. of Wales, Bangor, UK.


ABSTRACT

The number and range of the African elephant (Loxodonta africana) in Ethiopia have been significantly reduced, mainly during the last two decades. In the early 1970s, the total elephant population in Ethiopia was estimated to be around 9000. However, in 1990 aerial survey, this estimate has reduced to less than 2450 heads. The various aerial and ground surveys conducted in the Omo and Mago National Parks (OMNPs) are presented in this paper. The result shows elephant number in the two Parks is small and declining at an alarming rate. In 1978 aerial survey, 700-1000 elephants were estimated in the two parks. In 1994 aerial survey, the estimate has been reduced to 621 elephants. In 1997 aerial survey, only 250 elephants were counted in the Mago National Park (MNP). Ground surveys in the same year indicate that there are 300 elephants in the Omo National Park (ONP). The result shows that elephant population in the Omo and Mago National Parks has reduced by 44% and 62%, respectively, compared to the 1978 estimate. During 1997 ground survey, a total of 26 elephants were reported killed by the surrounding people in the MNP. Elephants in the OMNPs used to inhabit a very wide distribution and known to travel outside the National Parks extensively. Nowadays, continuous poaching and human encroachment, among others, has resulted in the extirpation of elephants from most of its former range in the OMNPs. Studies revealed that about 25% of the ONP and about 12% of the MNP area is occupied by permanently and/or temporarily settled people. Continued demand for ivory due to global potential marketing that accelerate poaching, destruction of the natural habitat and harassment by an ever-increasing human population have been causing threats against the maintenance of sustainable and healthy elephant population size in the Omo and Mago National Parks. If the current situation is allowed to continue, elephants will have the same state as rhino in a couple of decades.
of their former range and are forced to remain beyond 500 km from Addis Ababa. For instance the elephants of the central Rift Valley and the Awash River Valley exterminated between 1900 and 1934 (Yalden, et al., 1986). Ansell (1971) recognized three extant races of the African elephant in Ethiopia. These are *Loxodonta africana knochenaueri*, which used to occur in the southern part of the country between the Omo and Wabi Shebele Rivers and north wards through the Rift Valley as far as the middle Awash River. But recently they occur only in the Mago and Dawa River Valleys, *Loxodonta africana orleansi* was widely distributed to the east of Wabi Shebele River, south of Chercher highlands and north of Somalia. Nowadays, the remaining population occurs in the Babille Elephant Sanctuary and south of Harar. *Loxodonta africana oxyotis* is distributed in the northern and western part of Ethiopia, west of the Omo River as far as the Tekeze Valley in the north. All the three races currently occupy small portion of their former range (Largen and Yalden, 1987).

So far, very limited elephant surveys have been conducted in the country to determine population status and trend for management purpose. In 1986, EWCO estimated 8700 elephants in Ethiopia. In 1990 aerial survey, the estimate falls to 2450 (Allen-Rowlandson, 1990). This shows that there was probably 72% population decline in the country. The various aerial and ground studies conducted in the OMNPs reveal that small number of *Loxodonta africana oxyotis* and *Loxodonta africana knochenaueri* inhabit the Omo and Mago National Parks, respectively. Stephenson and Mizuno (1978) estimated 700-1000 elephants in the OMNPs. A recent aerial and ground surveys show that the elephant population has reduced to less than 600 heads in the OMNPs (Cherie Enawgaw, 1996; Graham, et al., 1996, 1997; Cherie Enawgaw, 1999 and Yirmed Demeke and Afework Bekele, 2000 a&b).

This paper aims to provide an overview of the current status of elephants in the Omo and Mago National Parks based on the available results of aerial and ground surveys conducted since the establishment of the two Parks. It also highlights the current distribution and movement and the major causes for elephant population decline at an alarming rate.

**STUDY AREA**

The Omo and Mago National Parks occupy the northern extreme part of the Omo Trough, covering an area of 6230 sq. km. The Maji highland forms the western boundary of the ONP and Gamo-Gofa highland escarpment forms the eastern boundary of the MNP. The area generally has a north-south gradient of relief with a corresponding rainfall gradient. Elevations in the highlands of 1500-2000 m fall to below 400 m south of the parks. Rainfall similarly ranges from 2000-375 mm annually. The parks fall midway in the gradient with 810 mm at Mui River. The area has one long and one short rainy season. The long and heavy rain is from March to May and the lighter rain is from September to October. It is an area of varied habitats including open grassland, savannah grassland, savannah bushland,
bushland, riverine forest and euphorbia thickets (Stephenson and Mizuno, 1978). Both parks are surrounded by settled agriculturalist and semi pastoralists consisting of ten tribes, namely, Bume, Surma, Dizi, Mursi, Bodi, Ari, Hamer, Bena, Karo and Mugji (Fig. 1). The two parks are home for 81 species of mammals, 325 species of birds and numerous species of fish, amphibians and reptiles.

Fig. 1 Omo and Mago National Parks.

METHODOLOGY

The approach used to produce current picture of the population status of elephants of the OMNPS is based on previous aerial and ground surveys conducted in the Omo and Mago National Parks and other case studies conducted on elephants and other mammals in the country such as Urban and Brown, 1968; Stephenson and Mizuno, 1978; Baba et al., 1982; Largen and Yalden, 1987; Hillman, 1990; Allen-Rowlandson, 1991; Lamprey, 1994; Cherie Enawgaw, 1996; Graham et al.,

DISCUSSION

**Distribution and movement of the African elephant in the OMNPs**

The various studies reveal that neither of the Parks supports resident elephant population. Yirmed Demeke and Afework Bekele (2000a) noted that elephants in MNP sporadically move up to 43 km outside the park boundary during the wet season. The elephants in the ONP are believed to move sometimes into the Sudan via the lower Kibish Valley. If rainfall is sufficient, elephants occupy the Omo-west Controlled Hunting Area and the western limit of ONP for several months before moving to the eastern part of the park (Cherie Enawgaw, 1996). The area is probably the last remaining refuge for the elephant population in the ONP. Stephenson and Mizuno (1978) described that elephants used to move to the north of the ONP via the Shorum River and to MNP crossing the Omo River around the southern end of the Mursi hill. Nowadays, Elephant movement to the Shorum River and to MNP is possibly totally closed due to expansion of settlements, agricultural land clearings and livestock encroachments to the neckline of the northern ONP along the Shorum and the Omo River banks (Fig. 2).

Elephants visit the Mui River mostly during the peak of the dry season between December and early March. They visit the River early evening and spent the night roaming along the River and leave early before the sunrise. It is possible to count them easily from the top of the Dirga hill early in the morning, before the elephants pass across the airstrip and Birke Plain. From this vantage point, the author was able to count 250-350 elephants in different occasions in 1993 and 1994 (Cherie Enawgaw, 1996). In the early wet season they move back to the Omo West Controlled Hunting Area following the same migration route year after year.

Elephants in the MNP used to inhabit the surroundings of the Jinka town, Woito Valley, Hammer area adjacent to the Omo-rate and a large portion of the Tama Wildlife Reserve. However, continuous poaching activities by the incoming people, primarily for courage and ivory, resulted in the extirpation of elephants from most parts of the south Omo (Yirmed Demeke and Afework Bekele, 2000b). They are now confined to the central and southern part of the Park mainly following the riverine vegetation along the Mago and Neri Riversides and the surrounding bush areas.
Fig. 2 Current distribution of elephants in the Omo and Mago National Parks.

The status and population trend of African elephant in the OMNP

All elephant sightings assembled by Stephenson and Mizuno, 1978; Largen and Yalden, 1987; Hillman, 1990; Allen-Rowlandson, 1991; Lamprey, 1994; Graham et al., 1996, 1997, Cherie Enawgaw, 1999 and Yirmed Demeke and Afework Bekele, 2000 a&b are compiled (Table 1).

Besides several sightings of smaller groups, 27 sightings of large groups (8 from the air and 19 from the ground) have been recorded. The existing qualitative
information clearly shows the population has steadily declined and its range has become progressively limited. The result shows that elephant population in the Mago and Omo has reduced by 62% and 44%, respectively, compared to the 1978 survey. In 2001 aerial survey only 4 elephants were counted in MNP (Bati et al, 2001). It is important to note that, Yirmed Demeke (1994) and Cherie Enawgaw (1996) made indirect population estimate of elephants, using elephant dropping density in the MNP and ONP, accordingly, their estimate were 976 and 764, respectively. In 1997, Yirmed Demeke and Afework Bekele (2000a) also studied elephant numbers in the MNP from dropping density and estimated 400 elephants. But the data are not used for comparison, as they are indirect estimate employing different methods.

The major threats on the population of elephant and other wildlife species in OMNPS

The major threats on the elephants in southern Ethiopia are basically encroachment, poaching, land clearing and population growth. Graham et al., (1996) noted that about 25% of the originally proposed Omo National Park and about 12% of Mago National Park are now occupied by permanently and/or temporarily settled people. The net rate of loss of land from Omo for settlement has averaged 1% per annum. Most serious encroachments in the Omo National Park are taking place along the Shorum and Omo Rivers, with settled people occupy most of the landscape (Lamprey, 1994; Graham, et al., 1996,1997). At the time of the Park establishment, Stephenson and Mizuno (1978) estimated about 300 people around the Shorum River but with no livestock. These days, extensive tracts of bush are being vigorously cleared for cultivation and many thousands of cattle, sheep and goats were seen with negligible wildlife numbers. Studies revealed that if the encroachment is allowed to continue the conservation value of the Omo National Park will be lost (Lamprey, 1994; Graham et al., 1996).

The Surma people extensively use the foot of the Maji escarpment for cultivation, honey collection, hunting and alluvial gold mining. In the upper Kibish Valley the Surma people also cultivate and herd livestock. The Bume people seasonally use the bottom and top of the southern Dirga hill. Lamprey (1994) and Graham et al (1996) noted thousands of cattle, sheep and goats along the entire length of the hill and around Illibai hot spring. Similar activities were also noted in Stephenson and Mizuno (1978) survey, but involving much fewer people and livestock. The Mursi people extensively cultivate almost the entire length of the Omo Riverbanks. They also use the Mursi escarpment within the MNP and the Elma Riversides, which extend into the north west of the MNP above the Mursi escarpment. This area was free from human occupation in 1976 survey (Stephenson and Mizuno, 1978). The survey of the Tama revealed that the Mursi cattle have increased by 11% per annum to a population of nearly 55000 (Graham et al., 1996).
Table 1 Records of groups of more than 100 elephant sightings in the OMNP.

<table>
<thead>
<tr>
<th>Locality</th>
<th>Method of survey</th>
<th>Population estimate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Omo</td>
<td>Mago</td>
</tr>
<tr>
<td>1973 Mui</td>
<td>Ground</td>
<td>540</td>
<td>-</td>
</tr>
<tr>
<td>1977 Usno River</td>
<td>Air</td>
<td>650</td>
<td>-</td>
</tr>
<tr>
<td>1977 Hot Spring</td>
<td>Air</td>
<td>175</td>
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<tr>
<td>1977 Hot Spring</td>
<td>Air</td>
<td>130</td>
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<td>625</td>
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<td>150</td>
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<td>423</td>
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<td>1994 Mui</td>
<td>&quot;</td>
<td>300</td>
<td>-</td>
</tr>
<tr>
<td>1994 Mui River</td>
<td>&quot;</td>
<td>280</td>
<td>-</td>
</tr>
<tr>
<td>1994 Mui-Birke Plain</td>
<td>&quot;</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>1994 Mui River</td>
<td>&quot;</td>
<td>350</td>
<td>-</td>
</tr>
<tr>
<td>1994 Mui River</td>
<td>&quot;</td>
<td>300</td>
<td>-</td>
</tr>
<tr>
<td>1994 Mui River</td>
<td>&quot;</td>
<td>300</td>
<td>-</td>
</tr>
<tr>
<td>1994 Kibish River</td>
<td>Air</td>
<td>369</td>
<td>252</td>
</tr>
<tr>
<td>1996 Usno Valley</td>
<td>&quot;</td>
<td>120</td>
<td>-</td>
</tr>
<tr>
<td>1997 Observation Site</td>
<td>&quot;</td>
<td>135</td>
<td>-</td>
</tr>
<tr>
<td>1997 ONP</td>
<td></td>
<td>300</td>
<td>-</td>
</tr>
</tbody>
</table>

The Karo and Mugji people, within the Southern edge of the Mago National Park, cultivate and herd livestock. The incursion of the Hammer people, with their cattle, goats and sheep, into the Park in the south is a recent activity (Yirmed Demeke and Afework Bekele, 2000b). The incursion of livestock into the southern part of the Mago National Park has resulted in the outbreak of Anthrax in the months of September to November 1999 and 2000, which brought about the death of a significant number of wildlife species (Leykun Abune et al., 1999; Kassa Abohay et al., 2000) (Table 2).

Poaching of elephants and other wildlife species has been a serious problem in the OMNP. In 1994 ground surveys, both Cherie Enawgaw and Yirmed Demeke recorded 6 and 33 carcasses of elephants in the study area of the Omo and Mago National Parks, respectively (Yirmed Demeke, 1994 and Cherie Enawgaw, 1996). In the 1997 ground survey, a total of 26 elephants were reported killed by the
surrounding people between August 1997 and April 1998 (Yirmed Demeke and Afework Bekele, 2000a). Graham et al., (1997) estimated that there are at least 40,000 people in walking reach of the MNP with 9,000 different types of firearms that can be used for hunting. This has resulted in the decline of elephant population number and other wildlife species of the OMNPs at an alarming rate (Graham et al., 1997; Cherie Enawgaw, 1999; Yirmed Demeke and Afework Bekele, 2000b).

CONCLUSIONS AND RECOMMENDATIONS

Elephant number is small and declining at an alarming rate. Continuous poaching and human encroachments, among others, has resulted in the extermination of elephants from most of its former range in both Parks. The situation was aggravated by the influx of modern automatic weapon during the changeover of the military regime. If the situation is allowed to continue, elephants will face the same fate as black rhino.

Studies revealed that People influence the ecology of about 37% of the two parks in the form of settlement, hunting, grazing, fishing and honey collection that extends over the entire portion of the parks. Proposed boundaries are probably never contributed significantly to the support of wild animals. A rearrangement of park boundaries to rationalize the situation with respect to human occupation are necessary before a viable protected area could be legally constituted and managed.

The Omo West Controlled Hunting Area is found to be important refuge for elephants during most of its time and for other wildlife species, thus, it is important to include the area with the Omo National Park.

It is evident that the challenges facing development of wildlife in Ethiopia calls for clear wildlife policy and legislation ensuring the sustainable use and integrity of wildlife resources through harmonizing human relationship with the resource.

Finally, I would like to recommend that a better knowledge of the current elephant population number, distribution and movement pattern is urgently required for better management of elephants in the Omo and Mago National Parks. This will be helpful to seek solution to ensure the continued survival of African elephant and other mammals in the OMNPs.

ACKNOWLEDGEMENT

I would like to thank Ato Leykun Abune, Dr. Ermias Bekele, Ato Yirmed Demeke, Dr. Zelealem Tefera, Ato Mohamed Abdi, Ato Kumara Wakjira and other Ethiopian Wildlife Conservation Organization (EWCO) staff for their comments on the draft of this manuscript.
Table 2  Carcasses of larger mammals found, following the occurrence of Anthrax in the Mago National Park (M=Male; F=Female; U=Unidentified).

<table>
<thead>
<tr>
<th>No</th>
<th>English Name</th>
<th>1999</th>
<th>2000</th>
<th>1999 and 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sex</td>
<td>M</td>
<td>F</td>
<td>U</td>
</tr>
<tr>
<td>1</td>
<td>Lesser Kudu</td>
<td>672</td>
<td>858</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Bushbuck</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Gerenuk</td>
<td>13</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>Warthog</td>
<td>10</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Rattel</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Mongoose</td>
<td>3</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Dikdik</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>Duiker</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Anubis Baboon</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>Lelwel Hartebeest</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>11</td>
<td>Tiau</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Waterbuck</td>
<td>2</td>
<td>1</td>
<td>3</td>
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<td>13</td>
<td>Oribi</td>
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</tr>
<tr>
<td>14</td>
<td>Aardvark</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>Caracal</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Porcupine</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Black and White</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Colobus</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>Grant's Gazelle</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Buffalo</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20</td>
<td>Elephant</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

REFERENCES


INSTITUTIONAL CONSTRAINTS TO THE CONSERVATION AND SUSTAINABLE USE OF WILDLIFE RESOURCES IN ETHIOPIA

Minassie Gashaw*

ABSTRACT

The wildlife management and utilization experiences of the neighbouring countries of Ethiopia such as Kenya and Tanzania are rich, and have made enormous contribution to their national economies. Although the wildlife resources of Ethiopia are comparatively rich, it has not been possible so far to utilize the resources effectively and properly. Efforts which have been undertaken in the wildlife conservation and management programmes have been hampered by a number of obstacles. Institutional problems are the major constraints that paralyse the wildlife sector and prevent it from offering large contribution to the national economy. Ethiopia has been suffering to a great extent by war and the wildlife resources have been victimized for many years. War and political instability have decreased the country's wildlife potential, consequently millions of dollars have been lost, particularly from tourism and other consumptive and non-consumptive uses of wildlife. During war times, local communities of the protected areas have expressed their anger and dissatisfaction by wildlife massacre and destruction of wildlife habitats. This problem is exacerbated by the very nature of the wildlife management practices, where in the past, the local communities were not involved in any type of wildlife management, development and utilization activities. Therefore, what had taken decades to build up has taken only overnight to devastate. Lack of legal frameworks and instruments in implementing the existing wildlife policies, and land-use conflicts have also aggravated the problem. Duplication and fragmentation of efforts among the different institutions in the biodiversity conservation programmes have contributed to the slowing down of the processes of wildlife conservation. Some institutions, particularly those which are directly involved in wildlife conservation have been structured several times, and are still under reformation; thus during each reformation, various new ideas and plans have been changed without finalizing and reshaping the former ones. Problems related to logistics such as financial constraints and skilled manpower shortages should also be mentioned. The above-mentioned major institutional constraints are discussed in depth, with references to specific cases. Most of these problems have frequently been addressed at different fora and in various disciplines, but still substantial changes have not yet been observed; therefore, further discussions and solutions should be sought.

INTRODUCTION

* Ethiopian Wildlife and Conservation Authority, PO Box 386, Addis Ababa, Ethiopia.
Wildlife conservation in Ethiopia has a long history that goes back to the time of Emperor Menelik II, who declared the first law in 1908 to protect poaching of wildlife, particularly elephants. However, there was no responsible institution to take care of the wildlife resources of the country until 1964. The Ethiopian Wildlife Conservation Organization (EWCO) has received the responsibility of conserving and protecting wild animals and their habitats since 1964. Thereafter, various policies and legislations were declared and some of them are still functional. Although EWCO was established that early and legally declared in 1970, and equipped with different wildlife laws and regulations, the institution has been facing various obstacles to successfully manage the country's wildlife resource, and consequently the wildlife sector has not contributed to the national economy as expected.

Most of the African wildlife institutes were established around the same period, i.e., in 1950s, and some of them started conservation practices late, during 1970s. However, the African wildlife institutes are successfully managing and utilizing their wildlife resources. Wildlife in Kenya for instance is the country's principal source of foreign exchange, exceeding the revenues from coffee and tea combined in 1989 (Kenya Wildlife Service, 1991). Annual income from visitors to National Parks and Reserves alone in Kenya is projected to increase from USD 18,570,000 in 1991/1992 to around USD 42,000,000 by 1995/1996. Tanzania, annually earns over USD 70,000,000, from wildlife in the form of tourism, sport hunting and live animal trade (ITC, 1989). Wildlife also forms an important source of the subsistence economy by providing meat to a large proportion of the Tanzanian population, which is estimated to be worth a further USD 50,000,000 (ITC, 1989). Ironically, Ethiopia collected insignificant amount of revenues from wildlife, including consumptive and non-consumptive sources of income, which was about USD 400,000 in 1998. Thus, Ethiopia is losing incredible amount of foreign currency compared to the other African countries.

Most of the African countries have made various types of structural adjustments and reformations to overcome disasters and crises in wildlife conservation and management. The government of Kenya for instance has created a new parastatal organisation, the Kenya Wildlife Service (KWS) in 1990 (Kenya Wildlife Service, 1991). This action was taken during a long period of decline in the standards of wildlife conservation in the country, i.e., when 85% of the country's elephants and 97% of rhinos disappeared in 15 years time. Although Ethiopia has made a number of structural reformations, it could not achieve the intended goals and objectives of wildlife conservation unlike the other African wildlife institutions. Financial and skilled manpower constraints are the major problems jeopardising wildlife management in the country. Unlike most of the African countries, Ethiopia has been suffering with war and political instability, which strongly affect tourism development and foreign investments in the wildlife sector. Therefore, the task of wildlife conservation is challenging, requires extended commitment from the
Problems related to policy and legislation

It is believed that policies such as wildlife, land use, forestry and other policies are lacking or rather are not full-fledged to act accordingly, and to manage the remnant natural resources of the country properly and sustainably. Although, the new wildlife policy at this moment is under process, there are still functional legislations and regulations. The presence of wildlife regulations goes back to early 1900's. During the time of Menelik II, the emperor forwarded a regulation on illegal hunting of wild animals particularly on Elephants. Then during the time of Emperor Haile Selassie, in 1930, 1943 and 1945 a series of legislations, mainly on sport hunting were issued. The Ministry of Agriculture at that time was responsible to implement these hunting regulations. However, until 1965 there was not any proclamation to provide the establishment of protected areas. As per the request from the Ethiopian Government, a group of professional researchers from the United Nations Environmental and Science Commission (UNESCO) came to Ethiopia to undertake wildlife census in the south, southwest and northeast parts of Ethiopia. Based on this survey it was recommended that the Ethiopian Wildlife Conservation Organization be established in 1994. Therefore, Ethiopia had certain wildlife laws and regulations since a long period of time, like most of the other African countries. An overview of some of the relevant African wildlife policies is indicated in Table 1.

As is clearly indicated in Table 1, Ethiopia shares some of the relevant wildlife laws and regulations with other African countries, whose wildlife management is far better. Thus it is not, in actual sense, the absence of regulations or laws that deter wildlife development and management; it is the lack or malfunctioning of the instrumental bodies or implementing authorities to enforce the laws and regulations. The responsibility in empowerment of wildlife management or the competent authorities in implementing wildlife conservation legislation differ from one African country to another. For instance in Ethiopia, Nigeria, South Africa and Sudan the responsibility for implementing wildlife conservation legislation is with the regional authorities, whereas in Kenya, Tanzania, Uganda, Zimbabwe, etc., the Federal Wildlife Conservation Bureau is the leading agency responsible for wildlife conservation. The degree of centralisation or decentralisation of park management and control is a key issue (Managing Protected Areas in the Tropics 1986). Central control simplifies planning and coordination and enables development of a more uniform and integrated protected area system. At the same time, regional disparities, different ecosystems and the need for indigenous knowledge are sound grounds for some delegation of decision-making to regional park managers. Whatever the approach, the essential consideration is that different levels and types of decision making be clearly specified and that channels of authority and responsibility be clearly identified. Since management decisions
often have to be taken quickly the more regional delegation of responsibility the better, provided that trained and competent personnel are available (Mackinnon et al., 1986). Ethiopia handed the management of national parks to the regional governments without preconditions that the regional bodies have the proper structural set up, from the point of skilled manpower and adequate budgets. Thus, this kind of power transfer might affect the management of wildlife conservation in the country.

Table 1 List of relevant legislation in force in some African countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Legislation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Legal Notice No. 120 of 1977, made pursuant to Act No. 1 of 1976.</td>
</tr>
<tr>
<td></td>
<td>2. Regulations No. 1912 of 1973 (made under the Sea Fisheries Act).</td>
</tr>
<tr>
<td></td>
<td>2. Game Regulations, 1935, as amended.</td>
</tr>
<tr>
<td></td>
<td>2. Game (Importation and Exportation for Transit purposes) Rules, as amended.</td>
</tr>
<tr>
<td></td>
<td>4. Fish and Crocodiles Act, 1950 (Cap. 228).</td>
</tr>
<tr>
<td></td>
<td>5. Natural resources Act (Cap. 150) and Amendments of 1981 (No. 16 of 1981).</td>
</tr>
</tbody>
</table>

Source: African wildlife laws by the IUCN Environmental Law Centre, Undated

In addition to the above problems there is a weak support or backup from the government side in the management of wildlife resource, compared to the other sectors where the government is giving much assistance. Whereas, there is an extended governmental commitment and dedication in the other African wildlife
institutes, because the decision-makers have already realized the potential and value of the wildlife sector.

**Institutional structure and reformations**

The different categories of protected areas such as national parks, reserves, sanctuaries, multiple use area etc. have different meanings and management practices in the different countries. Some countries follow strictly the different categories, for instance in these countries, no one may enter a park without a permit and there is no settlement, grazing or cutting of vegetation. Therefore, extractive resource use by humans from the national parks is strictly forbidden. Ethiopia does not follow the management of the national parks in this respect, because all of the Ethiopian protected areas are not free from human settlements. The conflict between wildlife management and human settlement is very challenging and so far the problem is not resolved, seriously affecting the resource. Resettling the people living in side the park is not an easy task, and requires due consideration of the willingness of the people and sound financial resource to do compensation. To allow limited extractive resource uses from the national parks, it should realize the long-term effect on the wildlife, and thus decisions should be based on careful study and research. For instance, the Ngorongoro conservation area is a multiple use conservation area, where the wildlife conservation is managed side by side with multiple uses by the local community, which is ideal to some of the conservation areas in Ethiopia, where it is somehow impractical to separate human settlement from wildlife conservation. In the Ngorongoro conservation area there are a number of departments such as law enforcement, range management, infrastructure development, protection fundraisers and other departments responsible for finance and human managements with total number of staff around 319 (Elephant Conservation Plan, Tanzania 1991). Therefore, the new policy and wildlife structure should reconsider the management of wildlife in accordance with the existing situations of the protected areas.

When we look at the internal structure of the various levels of the Ethiopian wildlife institutes, the organizational set-ups are highly simplified and obviously are under-staffed; particularly the number of trained wildlife experts and professionals are extremely small compared to the other African countries. If we compare the organizational structure of many of the African wildlife institutes, it is equipped with adequate number of departments and parastatals, responsible to substantiate the various objectives of wildlife conservation. When KWS was established in 1990, the staffing level was 3200 staff, which even represent almost a 30% decrease over 1989 levels. The staff development strategy rests on two measures, namely: recruiting qualified and experienced Kenyans for key positions, and providing adequate career prospects to its regular staff. Training, is given so much attention, and is the cornerstone of the KWS’s staff development strategy, and under the project substantial technical assistance resources are being provided to help build up KWS staff skills at all levels (Kenya Wildlife Service, 1991).
Therefore, KWS has made organizational or structural changes, in terms of staff adjustments, particularly increasing and strengthening senior management, and developing regional offices and building management capabilities. This has brought substantial achievements and successes in the wildlife conservation and management of the country. The proposed staff levels of KWS for 1993 is summarized in Table 2, and when compared to the structural set-up of EWCO of the same period, the KWS staff level is much higher. It is even much higher than the newly proposed staff level of EWCO for 2002, which is 450 staff at the head quarter and for four protected areas which are currently under EWCO administration. If we project this number to nine national parks and three sanctuaries, the staff levels do not exceed 1000; this is still very low compared to the staff levels of the KWS, which is more than 3000.

Similar to Kenya, the organizational setup of Tanzania is well structured, thus there are adequate technical and subordinate staffs responsible to implement the management of wildlife protected areas. For instance in 1991, the total number of staff in the wildlife sector of Tanzania operating in the National parks, Game reserves and Game controlled areas was 3577 (Table 3). The presence of the College of African Wildlife Management in Tanzania at Mweka has made possible the strengthening of the wildlife sector with adequate trained manpower. Ethiopia has also benefited from this college, although the number of students being sent is limited due to shortage of local budget and international support.

Comparing the above figures with the current staff composition of Ethiopia (Table 4), and with the 1987 figures of Sudan (Table 5), there is a huge gap. The figures clearly indicate the disparity of resources between parks and of the vast areas to be covered. In the Ethiopian and Sudan cases the extremely low staff drastically affects the wildlife management and development. Whereas in the Kenyan and Tanzanian cases there is equitability of resources between the wildlife protected areas and the huge areas to be conserved. Although the Ethiopian Wildlife Conservation Organization (EWCO) has currently proposed all in all 450 personnel at the headquarters, i.e. for two national parks and two sanctuaries, which EWCO is now administrating, the number is still low, particularly the number of officers or wildlife experts is very small. Therefore, Ethiopia, Sudan and other African countries with low economic development share the same problem of limited manpower resources for conservation.

It seems that only Senkele sanctuary is adequately staffed, since the conservation area is small and could be covered by the already allocated personnel. Still the number of experts in Senkele sanctuary is small. But the rest of the parks, and particularly the Babile Elephant sanctuary, are obviously understaffed.

Although the above figure does not accurately reflect the present situation in Sudan, it gives an idea of the imbalanced resources between parks and the spacious areas to be covered. Similarly, only Nimule was adequately staffed and therefore
feasible to be administered, due to the small size of this park, compared to the rest of the four national parks in Sudan.

Table 2 Proposed numbers of staff of KWS from 1993.

<table>
<thead>
<tr>
<th>Departments and Units</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headquarters</td>
<td></td>
</tr>
<tr>
<td>Senior Management</td>
<td>6</td>
</tr>
<tr>
<td>Director’s Office</td>
<td>10</td>
</tr>
<tr>
<td>Management Support Unit</td>
<td>4</td>
</tr>
<tr>
<td>Public relations &amp; Marketing</td>
<td>5</td>
</tr>
<tr>
<td>Finance &amp; Administration</td>
<td>46</td>
</tr>
<tr>
<td>Radio Network</td>
<td>11</td>
</tr>
<tr>
<td>Air Wing</td>
<td>8</td>
</tr>
<tr>
<td>Nairobi Workshop</td>
<td>58</td>
</tr>
<tr>
<td>Training Unit</td>
<td>22</td>
</tr>
<tr>
<td>Headquarters Total</td>
<td>170</td>
</tr>
<tr>
<td>Regional Management</td>
<td>40</td>
</tr>
<tr>
<td>Park/Reserve Management</td>
<td>1547</td>
</tr>
<tr>
<td>Community Wildlife Service</td>
<td>761</td>
</tr>
<tr>
<td>Education &amp; Visitor Services</td>
<td>116</td>
</tr>
<tr>
<td>Research</td>
<td>110</td>
</tr>
<tr>
<td>Planning</td>
<td>23</td>
</tr>
<tr>
<td>Security</td>
<td>593</td>
</tr>
<tr>
<td>Technical Services</td>
<td>404</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3764</strong></td>
</tr>
</tbody>
</table>


Table 3. Composition of staff employed by the Wildlife Division (WD), Tanzanian National Parks Authority (TANAPA) and Ngorongoro Conservation Area Authority (NCAA).

<table>
<thead>
<tr>
<th>Authority</th>
<th>Number of Administrators</th>
<th>Number of Working staff</th>
<th>Number of Field Staff</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife Division</td>
<td>84</td>
<td>47</td>
<td>2445</td>
<td>2576</td>
</tr>
<tr>
<td>TANAPA</td>
<td>175</td>
<td>135</td>
<td>387</td>
<td>697</td>
</tr>
<tr>
<td>NCAA</td>
<td>44</td>
<td>94</td>
<td>166</td>
<td>304</td>
</tr>
<tr>
<td><strong>Sub total</strong></td>
<td><strong>303</strong></td>
<td><strong>276</strong></td>
<td><strong>2998</strong></td>
<td><strong>3577</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>3577</strong></td>
</tr>
</tbody>
</table>

(Modified from Elephant Conservation Plan, Tanzania 1991).

Table 4 Resources for conservation, the Ethiopian case.

<table>
<thead>
<tr>
<th>Park/Sanctuaries</th>
<th>Officers/Experts</th>
<th>Scouts</th>
<th>Vehicles</th>
<th>Km.sq./staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awash</td>
<td>4</td>
<td>31</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>Yangudi Rasa</td>
<td>1</td>
<td>13</td>
<td>2</td>
<td>363</td>
</tr>
<tr>
<td>Senkele</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Babile Elephant</td>
<td>1</td>
<td>14</td>
<td>2</td>
<td>498</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
<td><strong>66</strong></td>
<td><strong>10</strong></td>
<td></td>
</tr>
</tbody>
</table>
Table 5 Resources for conservation, in the Sudan.

<table>
<thead>
<tr>
<th>Park</th>
<th>Officers</th>
<th>Scouts</th>
<th>Vehicles</th>
<th>Km. sq./staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinder</td>
<td>3</td>
<td>11</td>
<td>1</td>
<td>636</td>
</tr>
<tr>
<td>Nimule</td>
<td>1</td>
<td>17</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td>Radom</td>
<td>12</td>
<td>34</td>
<td>1</td>
<td>272</td>
</tr>
<tr>
<td>Southern</td>
<td>3</td>
<td>105</td>
<td>-</td>
<td>213</td>
</tr>
<tr>
<td>Boma</td>
<td>2</td>
<td>17</td>
<td>1</td>
<td>1200</td>
</tr>
<tr>
<td>Total</td>
<td>21</td>
<td>184</td>
<td>3</td>
<td></td>
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</tbody>
</table>


Another critical problem related to the structural set-ups of the different institutes is the absence of integration or coordination among the institutes. Institutes such as Environmental Protection Authority (EPA), Ministry of Agriculture (MoA), Forestry and Wildlife Department under MoA, Universities, Agricultural Research Organization (EARO), Institutes of Biodiversity Conservation and Research (IBCR), Ethiopian Wildlife Conservation Organization (EWCO), Tourism Commission, Local NGO’s such as Ethiopian Wildlife and Natural History Society (EWNHS), Regional Agricultural Bureaus etc. are working independently leading to duplication and fragmentation of activities. Therefore, it drains the financial, time and manpower resources of the country. The above-mentioned institutes have responsibilities in one way or another to conserve and promote natural resources including wildlife. Since each of these institutes is structured separately, there is no such strong linkage among them, and consequently there is redundancy of duties. For instance, the Forestry and Wildlife Department and EWCO are under the MoA, and each one of them is structured separately, thus they are not linked to one another to avoid duplication of jobs. The regional agricultural and natural resource bureaus are in most cases working independently with loose contact to the federal institutes. In order to promote tourism by the Tourism Commission, the infrastructure and other facilities of the national parks should be conducive, and similarly, development of tourist facilities has to be in harmony with environment. Therefore, unless these three institutes (EWCO, Tourism Commission and EPA) work collaboratively and harmoniously, it is difficult to expect development in the wildlife sector and boost the income from tourism and other means. Another duplication of efforts is done by IBCR and EWCO. EWCO has already identified a number of protected areas, and allocated resources to conserve and utilize them; similarly IBCR is now responsible for in-situ conservation and is presently identifying biodiversity priority areas for conservation. However, both institutes could join their efforts and resources for better conservation purposes. Furthermore, researches in the field of wildlife are very scarce and even the existing ones are not carried out in coordination and consultation among the responsible organizations, such as universities, IBCR, EARO, EWCO, EPA etc. As a result researches are not only duplicated, but also findings and recommendations may not be implemented, due to lack of coordination among the different institutions. This hampers the efforts to improve the wildlife management techniques and to increase the diversity and abundance of the species.
Other African countries such as Kenya, Tanzania, South Africa etc have managed to solve the problem of duplication and fragmentation of activities by structuring and integrating the different institutes such as Tourism, Environment, Wildlife and Forestry in one Ministry, i.e., the Ministry of Tourism, Natural Resources and Environment (Fig. 1).

Sometimes it is convenient if the same authority is responsible for management of all categories of protected areas to minimise duplication of effort and skills, competition for staff, land, projects and budgets, and inter-institutional jealousies. If more than one agency is involved, very close coordination and harmony should be established.

The management of wildlife protected areas is a highly intricate process, i.e. the management covers such a wide range of activities that it is impossible for the management authority to carry out all conservation related functions by itself (Mackinnon et al. 1986). There should be delegation of some duties and broad participation and cooperation from a spectrum of institutes:

- To enforce laws, coordination is required with the police, and perhaps with the military authorities as well as with the local government at all levels.
- The development of infrastructure and recreation facilities should go hand-in-hand with consultation of other institutions such as tourism and environmental protection agencies.
- The use of buffer zones peripheral to reserves (e.g., for sport hunting) has to involve working closely with forestry, agriculture departments, local community and other concerned or affected interests.
- Where reserves are established to protect vital watersheds, the protection authority should liaise with concerned departments such as water works, irrigation, agriculture and others.
- There should be some forum to negotiate with public works such as transport, communications, mining and others in case there is a need of access by these departments across protected areas.
- It is necessary to have proper channels of communication and cooperation with the military authorities in case there is a need to use large open areas for military exercise.
- There should be special relationships between the protected area managers and with research personnel or scientists outside the agency such as universities, biological societies, scientific and research institutes and centres, international and local NGOs, CBOs, etc.

Generally, the absence of a database and lack of networked information exchange system lead to an extreme resources wastage, which a country like Ethiopia cannot afford.
Fig. 1 Organizational structure of the Ministry of Tourism, Natural Resources and Environment of Tanzania.
The Ethiopian Wildlife Conservation Organization (EWCO) is currently under the MoA, while the major objectives of EWCO do not go along with agricultural developments. EWCO has grown up within other government agencies (e.g., forestry, natural resources and agricultural departments) and has inherited their administrative infrastructure without regard to its suitability for present protected area needs and management. Experiences indicate that a review and revision of the administrative arrangements of conservation departments may help to ensure effective decision-making. When the revision is done, we must be accurate to place the protected area management authority under the right ministry. Otherwise, if we go on revising one structure by another, it would be wastage of resources and time for achieving the intended or planned goal. Ethiopia is the best example for this, with a series of revisions over the last 30 years, which really hindered wildlife developmental activities. Therefore, EWCO has currently proposed to upgrade the status of its office to authority level, and to be autonomous.

Financial constraints

Finance is the key factor to promote wildlife conservation. No matter how the institutional set-ups are well organized and structured, unless there is adequate financial resource, any effort for conservation is going to be affected. One of the major reasons why EWCO is unable to meet its objectives effectively is because less attention has been given to this sector by the government in allocating enough budget to implement its activities. Until recently i.e., 1994, this sector did not have its own budget, the organization used to be financed inadequately from the forestry revenue. Just to get an idea, the amount received in 1994 from the forestry revenue was 76,000 Eth. Birr (about USD 9500). Therefore, almost for 30 years it was not possible to accomplish wildlife conservation programmes properly. Some donor agencies such as WWF, IUCN, AWF, UNDP, NZS, LZS, EEU, and other international aids have helped the EWCO to a great extent.

But, these alone could not lead the conservation activities anywhere. Unless there is a back up or counter fund from the government side, some international donors are not even willing to give financial support. However, from 1995 onwards, there is some budget assigned by the government to this sector (Fig. 2). It is likely that the government is learning from other African countries such as Kenya and Tanzania, and is paying attention to this sector. The government has now started understanding the role of wildlife sector in the prevention of natural catastrophes and droughts and that it could play a major role in contributing to the economic development of the country. Although there is some budget allocation since 1994, EWCO is still not in a position to overcome its badly needed capital expenditure.

Ironically, the revenues generated in the course of EWCO's activities accrue directly to the government, and in the past no independent accounts were prepared. If we take the experiences of other African countries such as Kenya, the creation of Kenya Wildlife Service (KWS) as a parastatal has changed the financial status of wildlife management in Kenya, as it was authorized to retain all revenue generated
through its operations and to receive a government subvention to cover part of its operating costs (Kenya Wildlife Service, 1991) (Fig. 3). The tourism revenue and a continued governmental support has allowed KWS to substantially increase the funds available for carrying out routine operations; its expenditure on this amount increased from KSh 80 million in 1989/90 to KSh 260 million in 1990/91. Before the introduction of KWS, i.e., during the time of the Kenyan Conservation and Management Department (WCMD), there was a drop in the capital budget from KSh 99 million to KSh 15 million in the years from 1988 to 1990. In 1991-92, this figure was further reduced to KSh 4.3 million. That is similar to the case in Ethiopia, where the Kenyan Government's financial support for the management and conservation of wildlife had been declining over the past decades (Kenya Wildlife Service, 1991). Once the wildlife sector is well established, then it could maintain itself and cover all the running costs, and even able to contribute to the national economy. The total annual earnings of the Wildlife Division (WD) in Tanzania for instance was approximately USD 2,572,506. Therefore, the main wildlife sector in Tanzania (Wildlife Division) could manage to cover its expenditure, and there was even a contribution of approximately USD 1.1 million to the central government.

![Annual recurrent budget (EWCO).](image)

**Fig. 2 Annual recurrent budget (EWCO).**

**CONCLUSION**

Civil strife, human settlement, agricultural expansion and deforestation have substantially devalued the protection areas available in Ethiopia. The rate of human population growth is not equitable with the economic growth, therefore, the pressure on the resources, particularly on land, has resulted in severe competition between wildlife and people. Major failure to develop and utilize the wildlife sector effectively has been caused by prolonged civil war, low economic growth, absence of legal bodies at the regional and federal level which are capable of enforcing laws and regulations, and at the same time weak follow up and settlement of court cases. In addition to this, the federal and regional bureaus have not been able to use the
revenue generated in the course of wildlife activities. Furthermore, the government's financial support and dedication is very insufficient. Participation of local communities, and cooperation and integration of any other concerned or relevant institutions in the management of protected areas, is not encouraging. Therefore, combination of the above mentioned and other related problems discourage the wildlife sector's activities, and the country is losing a considerable amount of foreign currency from wildlife.

Fig. 3 Expenditure against recurrent budget (KWS).

REFERENCES


DISTRIBUTION AND CURRENT STATUS OF THE ETHIOPIAN WOLF

Zelealem Tefera*

ABSTRACT

The Ethiopian Wolf *Canis simensis* is the most endangered Canid in the world. Assessing the distribution and the threats to the remaining populations of this critically endangered species is a conservation priority for the species. This paper presents the review and recent study of potential wolf ranges of Afro-alpine areas in Ethiopia. All the northern populations of the species are very small and are exposed to the effect of small size, and local extinction is also recorded in some areas of the species range. The relative importance of threats varies among populations. Loss of habitat due to the expansion of subsistence agriculture seems to explain these local extinctions. The main threats to the wolves’ survival are the prevalence of Canid disease in all wolf range areas and alleged livestock predation, which have escalated human-wolf conflict.

INTRODUCTION

The Ethiopian Wolf, *Canis simensis* is an endemic species confined to isolated pockets of Afro-alpine grasslands and heathlands of Ethiopia (Morris and Malcolm, 1977; Yalden et al., 1980; Yalden and Largen, 1992; Gottelli and Sillero-Zubiri, 1992; Sillero-Zubiri, 1994; Yalden et al., 1996; Marino et al., 1999; Zelealem Tefera, 2001). The species is currently confined to altitude above 3000 masl, although, earlier sightings of the species were recorded at lower altitudes below 3000 masl (Yalden et al., 1980). The Ethiopian Wolf is the only true wolf species and the largest member of the genus *Canis* in Africa (Wayne and Gottelli, 1997). The closest living relatives of the Ethiopian Wolf are grey wolves (*C. lupus*) and coyotes (*C. latrans*), rather than jackals or the African wild dog (*Lycaon pictus*) (Gottelli, et al., 1994).

The Ethiopian Wolf crossed over from Asia during the Pleistocene period less than 1 million years ago, when sea levels were lower, and Africa and the Middle East were connected. During the Pleistocene, the highlands of Ethiopia were predominately Afro-alpine moorland (Bonnefile et al., 1990), and these habitats were an ideal habitat for a variety of small mammals, particularly grass rats (*Muridae*). This Afro-alpine environment must have morphologically shaped the Ethiopian Wolf as specialised rodent hunter (Kingdon, 1990; Gottelli and Sillero-Zubiri, 1992).

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The Ethiopian Wolf has a large body size, long legs, a distinctive reddish coat, with white under parts, white throat, white chest, and white upper tail markings and a darker tail tip that distinguish the Ethiopian Wolf from other related members of the genus Canis in Africa. Its long legs and an elongated muzzle resemble the North American Coyote (C. latrans). Male Ethiopian wolves are 20% heavier than females (Gottelli and Sillero-Zubiri, 1992; Sillero-Zubiri, 1994).

Ethiopian wolves live in packs, with a discrete social unit that communally shares and defends an exclusive territory. Unlike many carnivores, pack members forage and feed alone on small rodent prey, which they commonly dig out from their burrows. The Ethiopian Wolf is most active by day, when it feeds almost exclusively upon diurnal small mammals (Sillero-Zubiri, 1994; Sillero-Zubiri et al., 1995; Zelealem Tefera, 2001).

The Ethiopian Wolf, which has been called the Simen fox, Simen jackal or the Abyssinian wolf, has been rare since it was first recorded by science. It is now one of two Canid species listed by the IUCN Red List of Threatened Animals in the critically endangered category, the other species being the Red wolf (Canis rufus) (Ginsberg and Macdonald, 1990; Baillie and Groombridge, 1996; Sillero-Zubiri and Macdonald, 1997).

Although the species is critically endangered, it is not listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), since no poaching or trade occurs. However, the species is legally protected in the country from any type of use that may threaten its survival. With a total world population of only 450 to 500 individuals surviving in relict mountaintops, the Ethiopian Wolf is the most endangered Canid in the world (Ginsberg and Macdonald, 1990; Baillie and Groombridge, 1996; Sillero-Zubiri and Macdonald, 1997).

The Ethiopian Wolf has become critically endangered as a result of:

- its specialised niche that has resulted in a restricted distribution to Afro-alpine grassland, the area of which have shrunk greatly since the Pleistocene due to gradual climatic change (Kingdon, 1990);
- recent habitat loss and fragmentation as a result of increased high altitude subsistence agriculture and high human population pressure (Humi, 1986; Mesfin Woldemariam, 1991; Marino et al., 1999);
- direct human persecution and negative attitudes associated with alleged domestic stock predation (Zelealem Tefera, 2001); and,
- the presence in wolf range of domestic dogs which affect wild Canids by direct competition and aggression, by acting as a disease vector and by introgression and out-breeding depression (Sillero-Zubiri et al., 1996; Laurenson et al., 1998).
In this paper I will present the review of present distribution and status of the Ethiopian Wolf in areas where the species exist.

**MATERIAL AND METHODS**

This paper review studies conducted on the distribution and status of Ethiopian wolves in all its ranges in Ethiopia. It is much dependent on the work done by Marino *et al.*, (1999); Zelealem Tefera (2001) and a recent fieldwork conducted in northern ranges of the Ethiopian Wolf areas of North Wollo, South Wollo, North Gondar and North Shoa.

Wolf population estimate for most of the area was given by locating the actual pack in a given area. Estimates for each habitat type were taken from known densities for the Bale Mountains, using the lowest density values for optimal, good and marginal habitat (Gottelli and Sillero-Zubiri, 1992; Sillero-Zubiri and Macdonald, 1997). The presence and biomass of rodents and mole rats has been shown to be a good index of habitat quality for the Ethiopian Wolf (Sillero-Zubiri *et al.*, 1995; Zelealem Tefera, 2001). A habitat was classified as optimal habitat (H1) when the rodent biomass is found to be 28 kg/ha or higher and with a vegetation type of Afro-alpine formation of short grass and herbs; good habitat (H2) with the rodent biomass of 15-9 kg/ha of rodent biomass and with monotone grassland and uniform *Helichrysum* scrub; and, marginal habitat (H3) was characterised by low density of rodent biomass (3 kg/ha) and predominantly ericaceous vegetation type.

Data for habitat quality assessment was gathered by walking a randomly selected transect and sampling at 200 m intervals with a 5 m radius circular plot. Presence and numbers of rodent holes therein was counted and the type, cover and dominant plant species was determined.

Habitat quality data was analysed by calculating the ratio between optimal and good to marginal habitat for each wolf range. Population estimate was made by counting the number of packs and the individual animals in the pack as well as by extrapolating with rodent density as described by Gottelli and Sillero-Zubiri (1992) and Sillero-Zubiri and Macdonald (1997).

**RESULT AND DISCUSSION**

**Distribution and current status**

The Ethiopian Wolf is a localised endemic and is confined to some isolated pockets of Afro-alpine grasslands and heathlands in Ethiopia (Fig. 1). The Afro-alpine habitat, characteristically represented by few mountaintops in the Ethiopian highlands was widespread during the Pleistocene. During the last glacial period (70000-10000 years BP), the African tropics were generally colder and drier than at present. Consequently, the moorlands of East Africa Mountains were about 1000m lower than they are now (Bonnefile *et al.*, 1990; Kingdon, 1990). Extrapolation of the present distribution of Afro-alpine habitat in Ethiopia suggests
that up to 100000 km$^2$ of Afro-alpine habitat may have been available to the Ethiopian Wolf and to its prey during the last glaciation (Kingdon, 1990; Gottelli and Sillero-Zubiri, 1992). The end of the Pleistocene brought climatic change and forced the extensive Ethiopian Afro-alpine moorlands to shrink to their present size, reducing the habitat available to the Ethiopian Wolf by an order of magnitude. Only about 2% (22750 km$^2$) of the total land area of Ethiopia is above 3000 m. Of this, less than 10% today consists of Afro-alpine steppes or mountain grasslands suitable for the Ethiopian Wolf, which is now found only in a few localised mountain pockets (Yalden and Largen, 1992; Gottelli and Sillero-Zubiri, 1992; Malcolm and Zelealem Tefera, 1997; Marino et al., 1999).

The Ethiopian Wolf was first recorded in the Simen Mountain range in Northwestern Highlands. Relict populations still occur in the Simen Mountains including the Ras Dejen, which is the highest peak in Ethiopia (4533 masl). The Simen Mountains range encompasses a total of 273 km$^2$ of suitable wolf habitat. In the Simen range, suitable wolf habitat is confined to the altitudes of 3700 and 4400 masl and distributed in four main areas interconnected by narrow habitat corridors. Of these areas, only the Geech Plateau is included within the Simen Mountains National Park, which was originally created to protect the endemic Walia Ibex (*Capra walia*). The Geech Plateau of the Simen Mountain National Park accounts for only small amount of available wolf habitat, and most of the suitable habitat therefore, lies outside the park. The habitat corridor connecting Bwahit and Silki is still vulnerable to agriculture since it lies outside the park. Ras Dejen is separated from other suitable habitat by steep slopes and cultivation fields, which reduce the total available habitat for wolves and increase the risk of habitat fragmentation.

On Mount Guna near Debre Tabor, a small wolf population is believed to occur at present but its distribution and status is not known. The Ethiopian Wolf is locally extinct in Mount Choke southwest of Gojam (EWNHS, 1996; Marino et al., 1999).

The North Wollo Highlands in the Northeast of the country have a relict population of the Ethiopian Wolf. In North Wollo area, Mount Abune Yoseph (4190 masl) Aboi Gara and Delanta ranges have a total area of 140 km$^2$ of important wolf habitat. The Abune Yoseph mountain range including the near by Atimata range form an extensive high altitude plateaux which gradually descends to the low lying agriculture areas and extends to Aboi Gara areas (3500-3700 masl). The Aboi Gara is a narrow strip Afro-alpine area with high human encroachment. It is separated from the Delanta ranges (3550 to 3750 masl) by about 15 km. In the South Wollo area, the Wolelet, range is the most important range for the distribution of Ethiopian Wolf. In this range, localities like Giguftu, Istaish and Kewa mountain ranges form suitable habitat for the Ethiopian Wolf. The Denkoro range, to the west of the mountain chain is partially protected as Donkoro State Forest. In the Wollo highlands expansion of agriculture and lack of formal protection of the wolf range limits wolf habitat.
The North Shoa areas of Goshe-Meda-Ankober (3700 masl) and Kundi (3900 masl) used to have small Ethiopian Wolf populations until recently. The last sighting of the wolf in these ranges of North Shoa was 1992 (Kenea Gaddisa, Personal Comm.). At present the wolf population is locally extinct from these ranges. The Guassa area of Menz in North Shoa is one of the smallest unit of afro-alpine area in Ethiopia. The area is a continuous area of suitable wolf habitat lying between 3200 to 3700 masl. The Guassa area is defined as a north-south extension of 100 km² afro-alpine area, bounded by a steep escarpment of the Rift Valley in the east and by low-lying agricultural areas of Menz in the west. The Guassa area has the largest optimal to good habitat ratio than other wolf ranges (Table 1). This is rendered possible by the communal management of the area by the community (Zelealem Tefera, 1995; Zelealem Tefera and Gebereyesus Tenagashaw, 1998; Zelealem Tefera, 2001).

The Arsi Mountains form the second largest available habitat in the country, with 870 km² of suitable wolf range. Suitable range lies between 3200 and 4100 masl.
The Galama Range, connected to the west to Chilalo Mountain forms a suitable habitat at 3300 to 3400 masl. The isolated mountain peaks of Mount Kaka and Mount Enkolo provide an extra patch of suitable habitat of lesser importance in the Arsi Mountain ranges (Marino, et al., 1999).

Table 1 Afro-alpine areas of Ethiopia, habitat quality for Ethiopian Wolf and population estimates.

<table>
<thead>
<tr>
<th>Region</th>
<th>Wolf Range</th>
<th>Study Sites</th>
<th>Altitudinal range (masl)</th>
<th>H1 (%)</th>
<th>H2 (%)</th>
<th>H3 (%)</th>
<th>Popn. Estimate</th>
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</table>

H1=Optimal habitat, H2=Good habitat and H3=Marginal habitat.

With more than 1000 km² of suitable wolf habitat, the Bale Mountains comprises the largest area of Afro-alpine area in Ethiopia as well as in Africa. The mountain complex includes: Sanneti Plateau (3800 to 4377 masl); the flat valley bottom of Web Valley (3400 to 3500 masl); and, the lowest wolf range of Gaysay Valley comprising a montane grassland (3000 masl). The Bale Mountains also contain the largest existing population of Ethiopian wolves (Table 1) (Morris and Malcolm, 1977; Hillman, 1986; Gottelli and Sillero-Zubiri, 1992; Sillero-Zubiri, 1994).
THREATS TO THE ETHIOPIAN WOLF

Habitat destruction and fragmentation
The specialised Ethiopian Wolf’s niche as a prime Afro-alpine rodent predator has resulted in the restricted distribution of the species. Once widespread, Afro-alpine habitat has become increasingly rare and fragmented due to gradual warming of the continent that pushed upwards the lower boundaries of the Afro-alpine grassland, which is the home for the Ethiopian Wolf main prey rodent species. The frequency of drought in the highlands has also reduced the population of rodents tremendously in the last few years.

Increasing high-altitude subsistence agriculture and grazing have further worsened habitat loss and fragmentation. The highlands of Ethiopia are among the most densely populated areas in the country. The problem of habitat degradation and high soil erosion due to high population pressure are widespread in all wolf ranges and remnants of Afro-alpine ecosystems are becoming more and more isolated making them ecological islands. This has increased the risk of local extinctions by the process of insularization (Kingdon, 1990). Loss of habitat can affect the survival of the Ethiopian wolves by decreasing the total habitat available and through habitat fragmentation. Much of the Ethiopian Wolf decline in the last few decades is the result of decreases in available habitat and fragmentation. Habitat destruction and fragmentation result in population isolation, increasing the rate at which genetic variability is lost. Increased rate of demographic and environmental stochasticity and increased contact with people, livestock and domestic dogs, in combination or singly, result in high risk of local extinction (Caughley, 1994).

Disease
As species become more endangered, their last remaining individuals are likely to be concentrated in a few relict populations. Any of these populations could be eradicated by a sudden outbreak of disease. The presence of large number of domestic dogs in Ethiopian Wolf habitat is the most immediate threat faced by the Ethiopian wolves in all wolf range areas. Domestic dogs pose a threat to the Ethiopian wolves by direct competition for food, by transmitting diseases and by hybridisation. In many situations in Africa, domestic dogs are the reservoir for rabies virus, canine distemper virus and canine parvovirus. These diseases have been shown to be potent force affecting wild carnivores and Canids in particular. Rabies poses a serious risk and is possibly the most dangerous disease that has affected the Ethiopian wolves. For instance, rabies was confirmed as the cause for nearly 50% decline of Ethiopian Wolf population in the Bale Mountains in the early 1990s (Sillero-Zubiri and Macdonald, 1997; Laurenson et al., 1998).
Human-wolf conflict

Increased exposure of livestock to wild carnivores conceivably results in stock losses and escalation of human-wildlife conflict. Most Canid species have been implicated to kill domestic stock. In many parts of the Ethiopian Wolf ranges, the conflict between wolves and local people is becoming a major conservation issue. The conservation attitude of local people living adjacent to wolf ranges are strongly influenced by problems associated with wolves. Communities which are unable to control the losses and damage that is caused by wildlife are more likely to develop a negative attitude towards the wolf. Even though direct killing of wolves is apparently being stopped or at least has been reduced, the attitude of the local people towards the wolves in Simen, North Wollo and South Wollo have been largely negative. Communities living adjacent to the Guassa area of Menz have shown a negative attitude towards the wolf compared to those living further away. Sheep predation was found to be the most important reason for the community to consider the Ethiopian Wolf as a nuisance species; even though reported sheep loss to Ethiopian Wolf per household per year was found to be very small (0.01). In communities with subsistence economy even small losses can be of economic importance and can generate negative attitudes towards conservation (Zelealem Tefera, 2001). In contrast, in the Arsi and Bale Mountains, people’s attitude towards the wolves has been largely positive.

Hybridisation

The Ethiopian Wolf population in Bale is known to have high level of hybridisation; this may affect the population by reducing fitness either by low fertility or viability causing outbreeding depression (Gottelli et al., 1994).

ETHIOPIAN WOLF CONSERVATION INITIATIVE

Due to the specialisation of the Ethiopian Wolf to the dwindling habitat and other factors affecting its survival, the species is now considered the rarest Canid in the world and the most endangered carnivore in the world. To protect this important flagship species of the Afro-alpine areas of Ethiopia, a programme under the name "Ethiopian Wolf Conservation Programme" (EWCP) has been initiated to assist with the conservation of Ethiopian Wolf populations and their Afro-alpine habitat. EWCP strongly believes that the Ethiopian Wolf will persist in its natural habitat if:

- the Ethiopian Wolf’s needs and those of the local people inhabiting the Afro-alpine ecosystem in Ethiopia are brought into harmony;
- the Ethiopian Wolf is widely accepted by the Ethiopian people as a flagship species to protect the unique highland fauna and flora; and,
- existing or future protected areas are well managed and have the support of local human population.
The main objectives of the programme are:

- To determine and counteract the threats to the survival of Ethiopian wolves, particularly those arising from fragmented population loss of habitat and coexistence with domestic dogs and humans,

- To secure the conservation of Afro-alpine areas, their biodiversity and ecological processes,

- To preserve at least 90% of the existing genetic diversity of the species for 100 years. This may be achieved solely through the conservation of wild populations.

The Ethiopian Wolf Conservation Programme spans all mountain areas in Ethiopia with known or potential populations of wolves. The programme is based in Bale Mountains National Park and also has a project office in Woldia for the Northern Ethiopia areas. The EWCP operates under an agreement with the Ethiopian Wildlife Conservation Organisation (EWCO) at a federal level and with Agricultural Bureaux of Amhara and Oromiya Regional States at regional level. Also the programme works closely with the existing protected areas, specifically the Bale and Simen Mountains National Parks.

The EWCP is actively engaged in the following activities:

- determining the distribution, status, and trends in all wolf populations through conducting repeated surveys over time;

- determining changes in the extent and quality of wolf habitat through habitat mapping and measuring prey abundance;

- monitoring the demographic trends (population numbers, pack size and structures, breeding success, survival rate and dispersal patterns) of the most important populations;

- monitoring the prevalence of Canid diseases by serological analysis among domestic dogs and wildlife populations as well as screening wolf populations to assess genetic variability and hybridisation among and within populations;

- addressing to the survival of wolves arising from coexistence with domestic dogs through vaccination and sterilisation of target dog populations;

- developing conservation education campaigns at all levels of the community. This will increase awareness of mountain residents in the rational for the conservation of the Afro-alpine ecosystem and its wildlife. The aim being to reverse adverse conditions for Afro-alpine wildlife due to human persecution and habitat exploitation;
• assisting with the management of protected areas to ensure the long term conservation of the Afro-alpine ecosystem, which is inextricably linked to the persistence of the Ethiopian Wolf;

• formalising the formation of a protected area status for all wolf ranges in Ethiopia;

• promoting community-based conservation in wolf ranges through full participation of the communities around the wolf ranges; and,

• continue the co-ordination of a national Ethiopian Wolf Conservation Committee comprised of all stakeholders through annual meetings.

CONCLUSION

The existing relict populations in a few Afro-alpine localities are small and isolated, making them increasingly exposed to extrinsic factors like human persecution and contact with domestic dogs, in turn resulting in disease and hybridisation. Due to their small size, they are also exposed to environmental and demographic stochasticity, genetic drift, and inbreeding depression. Although the persistence of different wolf populations requires further analysis, their persistence in very small ‘islands’ of habitat in almost every available Afro-alpine ecosystem in Ethiopia highlights the species’ resilience and adaptation to survive in fragmented habitats.

The Ethiopian Wolf Conservation Programme at present is working to save this flagship species by the conservation of Afro-alpine ecosystem in Ethiopia and presently extending its activity to all mountain ranges in the country. The Afro-alpine ecosystems are biologically relevant as far as many of Ethiopia’s endemic species are concerned, whose particular adaptation and limited ranges in Ethiopia makes them uniquely important in the African content. Apart from being home for most of the countries endemic species of fauna and flora, the Afro-alpine ecosystem provides valuable natural resources for the local people, whose rural economy and daily life is intricably dependant on the natural resources of the area such as livestock grazing, grass collection, collection of medicinal plants and firewood and utilisation of high altitude mineral springs (hora) to improve livestock health. On larger scale, the Afro-alpine ecosystems are the water catchment areas for almost all the main rivers draining the lowlands of Ethiopia, Somalia, Sudan and Egypt. As such, the continued existence of these areas is also critical for the well being of the human populations in the continent.

REFERENCES


WORKSHOP CONCLUSIONS AND RECOMMENDATIONS

PREAMBLE

The Biological Society of Ethiopia convened its 12th Annual Conference from February 14-15, 2002 at the Faculty of Science, Addis Ababa University. The main theme of the Conference was *The Conservation Areas of Ethiopia: Current Status and Future Prospects*. More than 200 individuals drawn from various governmental and non-governmental organizations, who are largely members of the Biological Society of Ethiopia, participated in the Conference. The conference hosted more than 30 scientific papers in the different biological disciplines, eight of which concentrated on the various aspects of the conservation areas of Ethiopia. The conference thoroughly deliberated on the papers presented during the conference and eventually identified the following main problems and drew up some recommendations.

MAN-MADE FIRES

In Ethiopia, the annual loss of high forest area is estimated between 150,000 and 200,000 ha, a rate which would in the coming 7-10 years change the remaining high forests into inaccessible scattered patches. Man-made fire has been noted to be a potent threat to the meagre forest resources of the country. The fire incidents that have occurred between the years 1990 and 2000, including the most devastating incident of 2000 are believed to have been started by individuals. The forest fires, which occurred during 1998 and 2000 in Bale, Borena, East Harerge, North Omo zones and other places destroyed an estimated 155,966 ha of forestland. These hazards completely burnt and destroyed 336 wild animals, 112 residential quarters and other properties, about 8000 beehives and 1,226 ha coffee plantations. Such large scale loss of forests affects not only the timber and non-timber forest products, but also all forms of wildlife therein and deprive us of the much needed ecosystem services. What is more, this would also have a serious impact on the seeds stored in the soil. For instance, the 2000 fire incident in Ethiopia accounted for the loss of nearly 90% of the seed bank. In this regard, the conference recommended that the factors that drive the local people or settlers to burn the forests should be identified and appropriate mitigation measures be taken to halt the problem.

OVERGRAZING

The presence of high numbers of livestock in protected areas has resulted in overgrazing, which is not only responsible for a decline in the wildlife populations but also has resulted in, among others, the loss of the ground cover, soil compaction, accelerated erosion and changes in species composition in most of the conservation areas of the country. In this context, the Abijata-Shalla Park, Awash...
Park, Omo Park, Nechisar Park and Senkelle Swayne’s Hartebeest Sanctuary illustrate the degree of threat inflicted by overgrazing in the protected areas. In addition, forest grazing by domestic animals in some of the Forest Priority Areas (FPAs) such as the Menna-Angetu Natural Forest has also caused serious damage to the natural resources. Studies have shown that livestock grazing was responsible for the depletion of more than 40% of the young forest trees. At times this has also caused a conflict of interest amongst different socio-cultural groups occasionally ending up in bloody strife. The Bumi-Surma clashes in the Omo Park illustrate the severity of grazing in protected areas. In view of the above, the conference recommended that existing laws and directives be enforced to minimize human impact on the conservation areas; mechanisms be sought to resolve social conflicts over natural resources especially around protected areas.

**POACHING**

The degree of hunting of wildlife in most parts of the country exceeds the sustainable supply, which in some cases has resulted in local extinctions. Between 1975 and 1988, poaching played a significant role in the reduction of the larger mammal populations in the ‘protected areas’. The problem has now been further exacerbated, a typical example being the local extinction of Grevy’s zebra and giraffe from the Awash and Mago Parks respectively. The dramatic decline of the wild ass population in the Danakil, with local extinction recorded at several places, is by and large attributed to poaching. Similarly, elephants and leopards are being seriously threatened by poaching. The increase in poaching activities could be related to the flourishing of illegal possession and use of firearms by local inhabitants. In this regard, the conference recommended that in order to safeguard the remaining wildlife resources, the wildlife core areas be made free from settlement (occupation) by people and the use of firearm for killing wildlife be regulated. In this regard, it was stressed that Grevy’s zebra and wild ass are killed for their medicinal values. Thus, the conference underlined that the construction of a clinic at a suitable site in the area would alleviate the problem. On the other hand, giraffes are killed just for trophy, and this problem could be mitigated by raising the awareness of the inhabitants.

**SETTLEMENT ISSUES**

All the protected areas in Ethiopia had settled people at the time when they were demarcated as protected areas. When some of the parks were legally gazetted, the assumption was that the people would be resettled elsewhere without affecting their livelihoods. However, resettlement was never carried out and most of the parks remained non-gazetted. The situation caused disappointment and frustration amongst the inhabitants, which eventually led to misuse and abuse of the resources in the protected areas. On top of this, there were also external pressures on the protected areas caused by drought and poverty in the surrounding areas. The Bale Mountains National Park is one of the protected areas highly threatened by human
settlement. It was pointed out that this park has been negatively impacted by human settlement in the form of forest clearance for cultivation, intensive farming, overgrazing and over harvesting of forest resources. A recent phenomenon is that more than 10,000 people who migrated from elsewhere and illegally settled in the natural high forest of the Bale Mountain, which is designated as one of the FPAs. As a result, over 25,000 ha of high forest area has been cleared and used for planting chat, banana and other crops. Although some measures were taken by the Oromia Regional State to push out the illegal settlers, local authorities did not enforce the decision, which resulted in the return of the settlers to the forest after some time. It was reported that settlement for cultivation is also posing a serious threat to the Omo Park, where at least 1% of the land area is lost per annum leading to a loss of almost a quarter of the original proposed area of concession. The conference then recommended that the original inhabitants should be resettled as per the original plan while all illegal settlers should be evacuated from the protected areas.

**DEFORESTATION THROUGH UNWISE INVESTMENT ACTIVITIES**

Some investment activities that have not passed through the proper environmental impact assessment procedures are inflicting enormous damage to the forest resources of the country. The case of the Chewaka-Utto Tea Plantation in southwest Ethiopia is a good example for this. The Chewaka-Utto Tea Development Project is located in Masha Wereda, Sheka Zone, SNNP Regional State. This project with a concession of about 3456 ha of land has been identified as a highly environmentally risky project because it involves the clearing of significant areas of natural high forest. The Maze Controlled Hunting Area is another victim of unwise investment activities. Once famous for its high wildlife potential, private investment in the form of mixed farming, mainly crop and livestock production, has led to clearing of the natural vegetation in the area. There are also other investment projects that have in one way or another interfered with natural resources, especially the meagre forest resources. The conference therefore concluded that it was unwise to give forested land for any kind of investment activities which result in changes in land use, and recommended that it should be mandatory to make sure that all investment activities in the country pass through sound environmental impact assessment procedures.

**INSTITUTIONAL CONSTRAINTS**

The following were the principal institutional constraints with regard to the country’s biological resources as identified by the conference:

- **Frequent institutional restructuring and reshuffling.** The forestry and wildlife sectors have been victims of this process, which eventually caused, *inter alia*, lack of continuity of programmes, diminishing resource allocation,
misplacement and loss of institutional information, ineffectiveness and low morale of personnel and general absence of clear direction and focus.

- **Fragmentation of responsibility and subsequent duplication of efforts.** The forestry and wildlife sectors have been fragmented among different ministries and institutions, namely, the Ministry of Agriculture (MoA), Environmental Protection Authority (EPA), Ethiopian Agricultural Research Organization (EARO), Institute of Biodiversity Conservation and Research (IBCR), Tourism Commission, regional agricultural bureaux and higher learning institutions. Due to lack of coordination among the stakeholder institutions, independent efforts are leading to duplication of activities. This would apparently drain the meagre financial and manpower resources of the country.

- **Lack of sufficient budget and trained human resources.** This has been a constraint in the relevant federal and regional offices. Comparison of the human and financial resources of an Ethiopian institution with those of some neighbouring countries would give a good picture of this impediment. While all the institutions dealing with wildlife resources have proposed about 1000 personnel, the Kenyan and Tanzanian equivalent institutions have more than 3,000 employees each. The financial position of the relevant Ethiopian institutions including EWCO is yet incomparable to the equivalent institutions in neighbouring countries.

To this end, the following recommendations were put forward:

- Institutional frameworks and linkages should be improved.
- Utmost attention should be paid to capacity building at the federal and regional levels.
- Conservation activities should be integrated by improving horizontal and vertical linkages of all stakeholder institutions involved in the utilization, conservation, development and research activities of biological resources.

**POLICY AND LEGISLATIVE ISSUES**

An effective conservation and management of biological resources in the country call for the availability of a strong and effective law with a strong enforcement mechanism. The conference, however, noted the following as the main legislative constraints associated with the conservation, development and utilization of forest and wildlife resources:

- **Lack of secured land and/or tree tenure.** In none of the systems that existed in Ethiopia up to now had the peasant a secured tenure over land. The fact that forests need longer period for their development calls for a long-lasting tenure. Lack of security of tree tenure has been a disincentive to farmers. Therefore, farmers are motivated neither to plant trees nor to protect the existing ones. The consequence of such situation is resorting to naturally grown forest for all-purpose utilization.
Investment in the area of forestry development is not active in this country. One of the reasons for the hesitation on the side of the investors, *inter alia*, seems to be lack of secured land and/or tree tenure.

**Issuance of a directive by the executive organ that disables the provision of proclamation No. 94/1994.** Checkpoints established for the purpose of controlling illegal movements of forest and wildlife products were lifted by a directive issued by the executive branch of the Federal State in 1989 E.C. The reason behind issuing the said directive was that the checkpoints had never been an effective means to control illegal movements of forest products as a result of corrupt forest guards and inspectors working at checkpoints. Hence, it is thought that forests and wildlife should be protected before they were removed instead of restricting their movement. However, this does not seem to work out either. First, although it is better to protect forests and wildlife in such a manner, the budgetary implication is high and unaffordable. Second, protecting forests and wildlife before they were removed cannot also escape corruption.

**Difficulty in prosecuting the alleged offenders and imposing sufficient penalty.** First, the fact that forest and wildlife resources cover very wide areas has increased the possibility for people to illegally remove them and run away without being noticed. On top of this, there is a legal hurdle of burden of proof. The courts require evidence that proves an actual felling of a tree or killing of wildlife by an offender. That is, even if somebody is caught red handed within protected areas holding forest or wildlife products or performing prohibited activities, courts are hesitant to convict him. Furthermore, the penalty clause of proclamation No. 94/1994 has no minimum penalty. Even the maximum penalty under this proclamation seems to be insufficient to deter illegal activities against forest resources. However, courts have discretion to impose the least possible penalty, when the law doesn't lay down a minimum penalty for an offence.

**Lack of regulations and directives.** Proclamations are relatively general laws and they require regulations and directives for their enforcement. In the absence of detailed rules of regulations and directives, it is difficult to put into action the general provisions of proclamations. For example, proclamation No. 94/1994 talks of benefit sharing by the local people. However, detailed rules are not provided as to how the benefit sharing is going to be exercised. Regulations and directives are needed for the implementation of the general rules of proclamations.

Therefore, it was recommended that the following measures should be taken to solve the problem:

- Laws, regulations and directives should be revisited to redress the shortcomings. Moreover, comprehensive forest and land use policies should be developed.
- Existing conservation-related policies and legislations should be harmonized.
Problems Pertaining to Resource Use and Ownership Rights

The most affected groups due to depletion of forest resources are those local communities that strongly depend on resources surrounding them. Therefore, efforts to conserve and sustainably utilize our resources should allow the participation of the local people in such a way that ownership and use right issues are properly addressed. Denial of access to these resources results in loss of sense of ownership and responsibility. Such a situation may lead to massive exploitation of natural forest resources by local communities, which at times occur beyond the recovery capacity of these resources.

At times, however, urban-based wood industries have in one way or another a “legally” grounded access to the same resources, although their contribution to the safeguarding of these resources is very little or none. Depletion of rare and endangered endemic tree species of the country are the consequence of all these. Benefits deriving from forest resources are usually not accruing to local communities who have customary and custodianship rights over these resources. Beneficiaries are usually those individuals or groups that have little or no direct involvement in the process of nurturing these resources. Eventually, this would instigate the local communities to convert the forest habitats into agricultural land for increased agricultural income.

With regard to the wildlife sector, it was concluded that promoting benefits to the local people is one of the utmost requirements. Eighty-five per cent of the total revenue collected from wildlife hunting goes to the respective regional governments. Accordingly, a total sum of Birr 3 188 403, 1 528 526 and 1 944 500 had been channelled to the Oromia, SNNP and Afar Regional States respectively within five years. The regional governments are expected to invest some portion of this revenue in developing infrastructure or any other way to the benefit of the local people. Although there are indications that the SNNP Regional State is allocating some money for the development of areas around the three parks (Omo, Mago and Nechisar), there is no evidence that this is really being implemented in other areas. Therefore, it was recommended that active participation of communities in the conservation and development of resources as well as sharing of benefits accruing from them, should be encouraged and local communities should be empowered on the conservation of local biological resources.

Research and Information Gaps

Basic and applied research is very instrumental in ensuring proper conservation and sustainable use of biological resources in the country. Taking into consideration the vast resources of biological diversity in the country, little has been done in the area of research promotion. Enormous biological resources are disappearing even before being known to exist in the country. Therefore, it was recommended that due attention be paid to inventorying of the biological resources.
in the country, undertaking studies on their biology and exploring methods for their conservation and sustainable use.

**AWARENESS CREATION**

One effective strategy to alleviate problems of a national magnitude is working towards creating and raising the level of awareness amongst the people. One effective means towards this end is allocating a sufficient media coverage to address the issue. In line with this, the conference noted that the media, especially of the government, should give adequate emphasis on the status of the protected areas and possible mitigative measures.
ANNEX: CONFERENCE TIMETABLE

Thursday 14th February 2002

8:30-9:00 Registration
9:00-9:30 Opening Session
• Programme Overview by Dr. Ensermu Kelbessa, V/President, BSE
• Prayer of Silence for deceased members of the BSE
• Welcoming Speech by Prof. Afework Bekele, President, BSE
• Keynote Address by H.E. Ato Gebremedhin Belay, V/Minister of Agriculture
9:30-10:00 Coffee/Tea Break

Workshop Session I
Chairperson Dr Ermias Bekele
10:00-10:30 Institutional constraints in the conservation efforts of the wildlife conservation areas of Ethiopia, Menassie Gashaw
10:30-11:00 Distribution and current status of the Ethiopian Wolf, Zelealem Tefera
11:00-11:30 Walia Ibex: a review of its population trend and conservation status, Berihun G/Medhin
11:30-12:00 Overview of the current status of the Ethiopian Wild Ass, Fanuel Kebede
12:00-12:30 Overview and status of the African elephant (Loxodonta africana) in the Omo and Mago National Parks, Cherie Enawgaw
12:30-2:00 Lunch Break

Workshop Session II
Chairperson Dr Assefa Mebrate
2:00-2:30 Current status of baboons in Ethiopia, Shimelis Beyene
2:30-3:00 The current status of Swayne’s Hartebeest in Ethiopia, Berhanu Gebre
3:00-3:30 Coffee/Tea Break
3:30-4:00 The importance of Ethiopian wetlands for migrant and resident waterfowls, Yirmed Demeke
4:00-4:30 The status of globally threatened resident birds of Ethiopia, Anteneh Shimellis
4:30-5:30 General Discussion and Resolutions
Friday 15th February 2002

**Parallel Session I: Biomedical Sciences**

**Chairperson** Dr Tsehaynesh Messele

8:30-8:50 The trend of anti-microbial resistance of pathogenic bacteria among patients of various infections in Ethiopia, Aberra Geyid

8:50-9:10 The elucidation of malaria transmission and its prevalence in highland urban area of Akaki town, Addis Ababa, Ethiopia, Adugna Woyessa

9:10-9:30 Intestinal parasitic infections and profile of CD4+ and CD8+ T-cell subsets and activation status in HIV-1 infected and uninfected adult Ethiopians, Afework Kassu

9:30-9:50 Cryptosporidiosis and isosporiasis among HIV/AIDS patients in Jimma, Southwest Ethiopia, Ebba Abate

9:50-10:10 The prevalence and anti-microbial responses on Yersinia enterocolitica isolates in comparison to those commonly encountered enteropathogens causing diarrhoea among Ethiopian patients in Addis Ababa, Birhanu Andualem

10:10-10:30 Multiple drug resistance and its associated factors in urinary pathogens at Gondar College of Medical Sciences hospital, Northwest Ethiopia, Feleke Moges

10:30-11:00 Coffee/Tea Break

**Parallel Session II: Botany**

**Chairperson** Dr Masresha Fetene

8:30-8:50 A case study of wild fire incidence of 2000 in Harenna Forest, Ethiopia, Getachew Tesfaye

8:50-9:10 Core collections: practical approach to genetic resources management, and its prospect for Ethiopia, Tesfaye Baye

9:10-9:30 Variation and association of morphological and biochemical characters in Grass Pea (*Lathyrus sativus* L.), Wuletaw Tadesse

9:30-9:50 Ethnobotany of the Gumuz people of Western Ethiopia, Tesfaye Awas

9:50-10:10 The chemical basis for anti-herbivore defense of plants, Aman Dekebo

10:10-10:30 Use and management of traditional medicinal plants by indigenous people of "Boosat" Wereda, "Welenchiti" area: an ethnobotanical approach, Debela Hunde

10:30-11:00 Coffee/Tea Break
Parallel Session I: Biomedical Sciences
Chairperson Dr Aberra Geyid
11:00-11:20 Laboratory and field trials on the evaluation of endod towards its application for the treatment of epizootic lymphangitis, Gobena Ameni
11:20-11:40 Phylogenetic analysis and diversity of HIV-1 envelope V3 sequences from seroconverters of the two Ethiopian HIV-1 cohorts, Measho Hagos
11:40-12:00 The commonly used toothbrush sticks of Ethiopia: antibacterial and non-cytotoxic, Afework Kassu
12:00-2:00 Lunch Break

Parallel Session II: Zoology
Chairperson Dr Abebe Getahun
11:00-11:20 Cercopithecid long bones from the Plio-Pleistocene strata of the Middle Awash, Ethiopia, Solomon Yirga
11:20-11:40 Animal rights?, Brook Lemma
11:40-12:00 Spatial organization and social relations in the golden jackal (Canis aureus) population in the Bale Mountains, Ethiopia, Ermias Admassu
12:00-12:20 Processing of fish skin and scales around Lake Tana, Alemu Assefa
12:20-2:00 Lunch Break

Biology Education Session
Chairperson Dr Zemede Asfaw
2:00-2:20 A methodology for analyzing some aspects of school biology textbooks, Mekuanent Kelemu
2:40-3:00 Coffee/Tea Break
3:00-5:00 Business Session
• Activity Report by Prof. Afework Bekele, Outgoing President of BSE
• Financial Report by Dr. Emiru Seyoum, Outgoing Treasurer of BSE
• Election of Office Bearers
• Vote of Thanks
BIOLOGICAL SOCIETY OF ETHIOPIA

OBJECTIVE
- Create awareness on environment and development issues in the formal and informal education sectors and amongst the general public;
- Promote biological research and encourage biologists to strive for professional excellence;
- Contribute to the growth and development of biological education and give technical support and encouragement particularly to biology teachers;
- Enable biologists to interact with their local as well as international counterparts through seminars, workshops, symposia, publications, etc.;
- Popularize biological science through publications and the mass media;
- Provide consultancy services and conduct collaborative investigations on issues that require biological expertise;
- Publish scientific journals and other documents as media for communication among its members and the general public.

ACTIVITIES
- Organize conferences, workshops, seminars, panel discussions and film shows;
- Support the existing environmental education school clubs and encourage the establishment of others;
- Publish background reading materials on biological topics in English and the main local languages to improve the understanding of biological issues for students, teachers, and the general public;
- Create networks with sister societies and organizations at national and international levels on matters of common interest;
- Seek for funds to support the society's activities.

ORGANIZATION
The Society is governed by an officially registered constitution and is managed by an Executive Committee elected for a period of two years by the General Assembly. The Executive Committee consists of President, Vice president, Secretary, Treasurer, Editor-in-Chief, Public Relations Officer and three ordinary members. In addition, it has a Programme Coordinator to run the Society's activities.

MEMBERSHIP
There are four types of membership:
- Regular - those who have a diploma or higher qualifications in biology or those who have studied biology for at least two years at university level;
- Associate - Biology teachers or persons engaged in biological research who do not fulfill the requirement for regular membership;
- Institutional - institutions wishing to support and benefit from some of the activities of the Society; and
- Student - those registered in higher education institutions and who are majoring in biology.

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