# BABILE ELEPHANT SANCTUARY

# MANAGEMENT PLAN

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Addis Ababa, Ethiopia

Ethiopian Wildlife Conservation
Authority (EWCA)

Wildlife for Sustainable
Development (WSD)

Horn of Africa
Regional Environment
Centre and Network

# Acronyms

AfESG - African Elephant Specialist Group

BCZ - Biodiversity Conservation Zone

BES - Babile Elephant Sanctuary

BPR - Business Processes Reengineering

CBD - Convention on Biological Diversity

CBEM - Community Based Ecological Monitoring

CBOs - Community Based Organizations

CHA - Controlled Hunting Area

CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora

CMS - Convention on Migratory Species

CSA - Central Statistics Agency

CSE - Conservation Strategy of Ethiopia

CUZ - Community Use Zone

DAs - Development Agents

DSE - German Foundation for International Development

EIA - Environmental Impact Assessment

EPA - Environmental Protection Authority

EWA - Ethiopian Wildlife Association

EWCA - Ethiopian Wildlife Conservation Authority

EWCO - Ethiopian Wildlife Conservation Organization

EWNHS - Ethiopian Wildlife and Natural History Society

FfE - Forum for Environment

GDP - Gross Domestic Product

GIS - Geographic Information System

GPS - Global Positioning System

HEC – Human-Elephant Conflict

HQ - Headquarters

HWC - Human-Wildlife Conflict

IBC - Institute of Biodiversity Conservation

IRUZ - Integrated Resource Use Zone

IUCN - International Union for the Conservation of Nature and Natural Resources

KEAs - Key Ecological Targets

m asl - Meter Above Sea Level

MIKE - Monitoring the Illegal Killing of Elephants

MoU - Minutes of Understanding

MP - Management Plan

NGO- Non-Governmental Organization

NP - National Park

PAs - Protected Areas

PLC - Private Limited Company

SO - Strategic Objectives

SSA - Sub-Saharan Africa

SSC - Species Survival Commission

UNESCO - United Nations Educational, Scientific and Cultural Organization

USAID - The United States Agency for International Development

USFWS - US Fish and Wildlife Service

WCI - Wildlife Conservation International

WSD - Wildlife for Sustainable Development

WWF - World Wildlife Fund for Nature

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## Executive Summary

Babile Elephant Sanctuary (BES) was established to conserve a significant population of Elephants in Eastern Ethiopia. It happens that the population at BES is also the last remaining eastern most population in the Horn of Africa. Besides its relic Elephant population, this site also harbors other significant fauna and flora. Together with Gara-Muleta Mountain, BES also forms a significant section of the watershed for the Wabi-Shebele River Basin. The sanctuary has diversified attributes associated to biodiversity, economy and socio-politics such as climate stability, wildlife and cultural diversity, tourism (wildlife and historical sites), and sustenance of livelihoods. In view of the sanctuary's sustainable development program, these attributes are interlinked and should be treated holistically.

Regardless of its conservation significance, the sanctuary's conservation problems are complex. The sanctuary is beset by anthropogenic threats including agricultural and settlement expansion, poaching, resource-use conflict, human-wildlife conflict, and invasive species. However, BES never had a Management Plan (MP) to resolve these threats in a well integrated and holistic approach. Thus, the development of a workable MP for BES is one of the highest priorities for Ethiopian Wildlife Conservation Authority (EWCA) at present. This MP attempts to provide ideas of how the growing human population and the remaining wildlife resources of the area can co-exist in harmony by avoiding/mitigating conflict and securing livelihoods for people.

The MP offers interventions over a specified period of time for required action at BES. Suggested interventions are hoped to ensure the continued survival of the sanctuary under present threats and safeguard its valuable natural resources. The various chapters first attempt to show the importance and values of BES at a local, national and global level, identify threats and opportunities as well as recommend various wildlife management and development activities. The latter part of the MP describes strategic objectives, operational objectives, activities and a timetable for their implementation.

The MP provides guidelines and acts as a tool for achieving the mission of BES of protecting wildlife resources based on sufficient scientific knowledge and participatory principles for the benefit of local communities. The management of BES focuses on biodiversity conservation, conflict mitigation, research and monitoring, education and finally recreation and tourism. Three strategic goals that define the overall direction of the sanctuary providing a unifying theme for its strategic and operational objectives, programs and activities are:

1. Biodiversity conservation, protection and management,
2. Building partnerships with communities and other stakeholders,
3. Building sustainable mechanisms for organizational effectiveness and income generation.

This document provides suggestions for managing the site by upgrading it to a national park because of its unique features and a zonation plan into different management zones. Conservation of biodiversity, research on Elephants, mitigation of human-wildlife conflict, and livelihood improvement including tourism development are important segments of the MP. Outreach in the form of environmental education, awareness creation and promotion of wildlife conservation are considered to be extremely important. Environmental education will be seen as a component in a number of strategic objectives in the MP. This MP has a five-year plan and considering inflation of materials and services, budgets for specific activities will need to be developed as work proceeds.

# 1   Introduction

By definition, a management plan is a document providing interventions expressing actions required to ensure that a selected site achieves the purpose for which it was established. Planning is usually complex and its complexity deepens depending on the number and diversity of various user groups in an area. A management plan as an action-oriented document needs to appreciate a number of issues at various scales including social, economic, political and ecological factors. At another level, it incorporates a site-based approach that has a number of activities that lead towards the achievement of an overriding objective. No one is an expert in everything and therefore management plans are usually developed in a multi-disciplinary fashion so that problems and their solutions can be seen from various angles. Management plans historically serve the purpose of establishment alone. This meant that they were developed with a narrow vision of accomplishing the needs of the institution that requires the management plan. This kind of approach is outmoded and has been replaced by participatory approaches that include all key stakeholders at the site.

Babile Elephant Sanctuary was established with the main aim of conserving the relic and fragmented population of Elephants found in the eastern part of the country. It was established in 1970 following an Imperial edict of Emperor Haile Selassie. It is noted that the Emperor was informed of indiscriminate hunting of Elephants and Lions in the area during his visit in 1968. Before the Imperial edict, the site was known as a controlled hunting area (CHA) and served for sport hunting of Elephants and Lions. There is also an understanding that illegal hunting was rampant before the founding of this protected area and Elephants in particular were hunted for their valuable ivory. This ivory was transported to Somalia and Djibouti and shipped out to various Arabian and Asian countries. Haile Selassie's decree arrested all former hunting and paved the way for the establishment of the present day Elephant Sanctuary. It is noted in its history that its boundaries were defined using natural features including valleys and escarpments. A small office with few scouts was also placed first in Harer Town and latter moved to Babile Town to oversee conservation and development work. Beyond these initial

establishment and staff allocation tasks, there are few if any major conservation highlights in this area. A few scientific studies especially by Stephenson (1976) give us exceptional insights on the sanctuary's resources and conservation efforts.

Babile Elephant Sanctuary occupies an area of nearly 7000 sq km and is undeniably one of the largest protected areas (PAs) in the country. It is located within the extensive Somali-Masai Biome which extends all throughout the Horn of Africa and most of Eastern Africa. Deciduous small-leaved vegetation, *Acacia* and *Commiphora* are the most dominant flora of this area. This part of the country is in general known for high endemicity of various plants. Scrub and grasslands are also form major habitats throughout the region. The Elephant is the most unique wildlife of the area but in total the area has 30 species of mammals and not less than 191 species of birds (Mihret Ewnetu *et al*., 2006; Yirmed Demeke and Mihret Ewnetu, 2008).

Conservation of wildlife and even the existence of the sanctuary have been nominal throughout its history. Since inception, the sanctuary has not been free from human interference. Efforts to resettle people elsewhere from the sanctuary have not been attempted and growing competition between human beings and wildlife has become an issue of conflict between survival and demise. Human needs require more land to be cleared, trees and bush are converted to charcoal to meet energy demands. Moreover, poaching and other illegal activities are issues on which the sanctuary staffs have little control over.

Notwithstanding the renewable nature of most natural resources, it is universally understood that resources with particular reference to land, water, plants and wildlife are limited. We live in a world which puts increasing demand on the land and its resources for unlimited economic growth. Within this contradiction, all protected areas serve as grounds for potential or actual conflict. They are seen by most as impediments to growth and by others as opportunities for sustained growth. We believe that BES provides and has provided opportunities for the growth of its human lives, wildlife and domestic animals for ages. We also see that it cannot provide these elements for sustenance

indefinitely. There will come a time when its capacity is surpassed by greed or need and someone needs to pay the consequences. Ultimately, we see that the essence of conservation is not protecting unique wildlife or particular habitats. It is in fact our struggle to give earthly life a meaning and to strive for a higher quality of livelihoods.

Conservation, then, cannot come about by haphazard paths that entail trials and errors. One of the best ways of conserving and making best use of BES's vast resources is to know important aspects of who, what, where and when. This can be achieved by a process of planning that shows us the past, present and future. This MP has been developed to give guidance on actions required for conserving and making best use of BES's rich resources. Babile Elephant Sanctuary, which is known to support over 340 Elephants, is believed to be the only protected area in eastern Ethiopia with a viable number of Elephants (Yirmed Demeke, 2009).

# 2   Objectives of the Management Plan

This MP for BES was developed for a five year implementation period. It was designed with the following main objectives in mind:

1. To provide an overview of the biophysical assets, significance and conservation values of BES.
2. To show that conservation at BES can achieve stronger results in context of the surrounding socio-economic dimension.
3. To provide a list of actions that are needed to achieve resource conservation and sustainable development goals at BES.

# 3    Limitations of the Management Plan

Due to time, budget constraints and other logistic needs, aerial surveys were not carried out in the area and most part of the sanctuary is not accessible due to security and access reasons. As a result, detailed systematic investigation on population status and seasonal distribution of major fauna and flora not collected except for the northern and western part of the sanctuary. Thus, this MP bases itself on previous studies in the area. Areas along the Dakata and Fafum Valleys were not visited and most of the available information is collected and collated from the Erer and Gobele Valleys and adjacent areas.

The development of the MP based on limited data may widen the information gap on pastoralist resource needs, seasonal distribution and ecology of mammalian and avian fauna. However, the efforts made to use all available information about the area including research results and secondary data collected using informal approaches could enrich the basic assessment that was carried out by Yirmed Demeke from 2004-2009 and EWCA from 2007-2009 on Elephant distribution and movement, and socioeconomic activities. This may guarantee to come up with conditionally workable MP. However, it is expected that the  boundaries on the Somalia side could be modified based on detailed investigation on seasonal distribution and migration routes of key mammals, dimension of human activities and other lessons that could be learned in the process of implementing the MP.

# 4  Background

**General**

Babile Elephant Sanctuary was established primarily to conserve the existing Elephant population in this part of the country. The history of establishment of protected areas in the past used to rely more on the presence of mega fauna or charismatic species such as the Elephant. This trend has been the impetus for the initiation of the establishment of most national parks (NPs), sanctuaries and wildlife reserves in Ethiopia. While the setting up of protected areas had a fallacy of conserving for a particular reason i.e. conservation of an endangered species or the aim of generating revenues through tourism, it also brought along with it resentment which in most cases culminated in an all-out conflict between local people who have to bear the costs of conserving a protected area and conservationists who had a mindset that they were carrying out conservation for the good of generations to come. One way of avoiding conflict is to create awareness and co-manage protected areas with local constituents living in or around the protected area. Protected areas like BES continue to provide numerous ecological services and products that are priceless but have been taken for granted. Without these ecological services and products the present human population inside and adjacent to BES would not have been able to survive and grow. This is the natural capital that conservation managers would need to use as a currency to get closer to the local people. This section describes some of the assets, beyond Elephants, that BES provides for the day to day survival of its inhabitants.

## 4.1  Physical and Biological Resources

### 4.1.1  Location and topography

Babile Elephant Sanctuary is Ethiopia's eastern most protected area that was established about 40 years ago. The sanctuary was established primarily to protect the relic and

ecological distinct subspecies population of the African Elephant, *Loxodonta africana africana*. It is situated in the semi-arid parts of eastern Ethiopia approximately 560 km from the capital city, Addis Ababa (Figure 4.1). The sanctuary is found within the Somali-Masai Biome which extends for a larger part of southern and eastern Ethiopia. The BES gets its name from the nearby town of Babile, which is about 15 km north of the sanctuary's boundary.

Babile Elephant Sanctuary is located between the latitudes of 8°22'30" and 09°00'30" and longitudes of 42°01'10" and 43°05'50". The altitude ranges from 850 m asl to 1785 m asl (Figure 4.2). During establishment, the sanctuary covers an area of 6,982 km$^2$ (698,200 hectares) with an average length of 80 km from North to South and a width of 98 km from East to West (Stephenson, 1976; Hillman, 1993). However, the sanctuary's boundary was re-demarcated in 2008 to exclude intensively used agricultural and settlement areas to the North in Fedis, Midega Tola and Babile Districts and to the Northeast in Babile-Somali District. Even though this action reduced the original area of BES by 19 % (1,507 km$^2$), it also proposed to include other important wildlife habitats which are adjacent to the sanctuary based on the annual ranges and movement patterns of collared Elephant herds, and using high resolution Google Earth satellite images and topographic maps in areas which are not accessible due to security risks (WSD and EWCA, 2010). These include areas in the North along Erer Valley (23 km$^2$), in the West, West of Gobele Valley (732 km$^2$) and in the South from Harer CHA (2,158 km$^2$) which are not occupied by people. The proposed area of the sanctuary is estimated to be 8,388 km$^2$ (Figure 4.3 and 4.4), which is an increase by 1,406 km$^2$ from the original area of the sanctuary. Refer Appendix 4 for the details of the proposed boundary description.
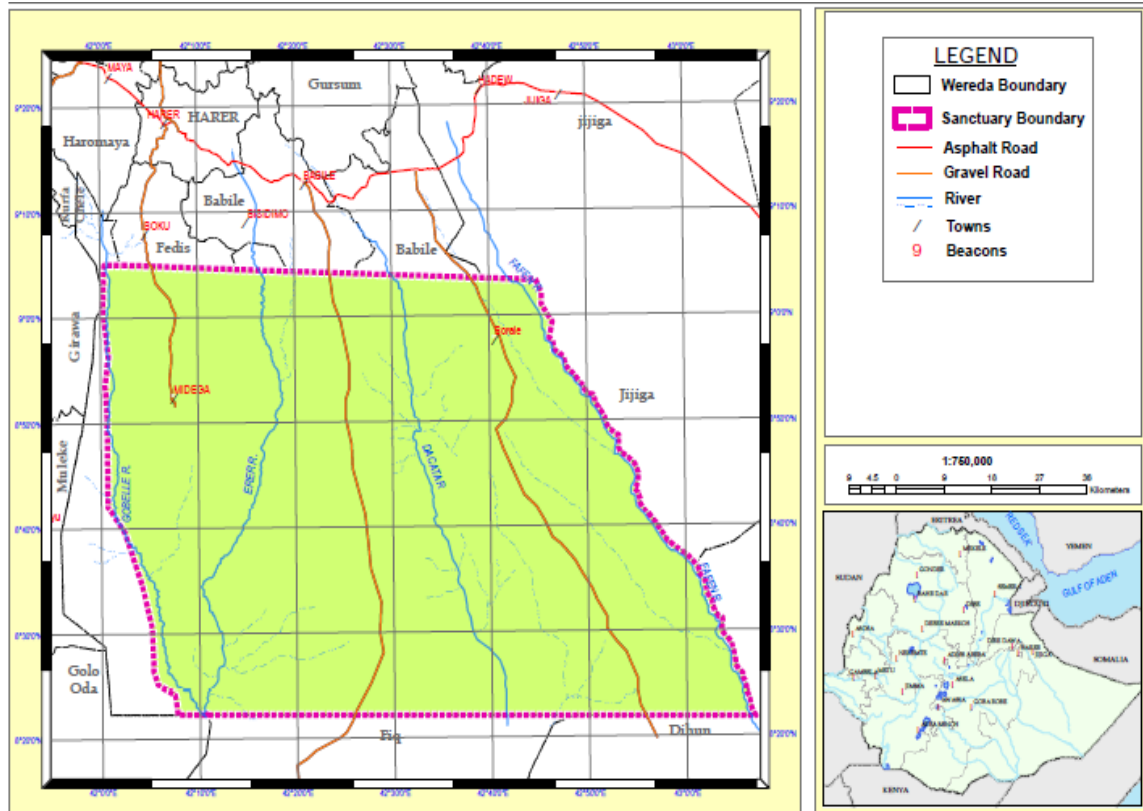
**Figure 4.1.** Location and previous map of BES (Source: EWCA Archive, 2008).

Babile Elephant Sanctuary is a transboundary protected area between Oromia and Somali Regional States. Previously about 78% (5,446 km$^2$ of the sanctuary was located in Somali Region, while the remaining 22% (1,536 km$^2$) was in Oromia Region. With the current re-demarcation proposal, the area within Oromia Region is reduced by 4 % and covers about 1,510 km$^2$ and the area within the Somali Region increased to 82% and covers 6,878 km$^2$ (WSD and EWCA, 2010).

The major physical features of the sanctuary are the four drainage valleys rising from the Garamuleta-Harer-Gursum high mountain range in the north and extending southwards creating their respective river basins to join Wabi-Shebelle River Basin. These distinctive valleys are known as Gobele, Erer, Dakata, and Fafum from west to east. These river basins and their tributaries have created distinctive valleys and gorges. Amongst these
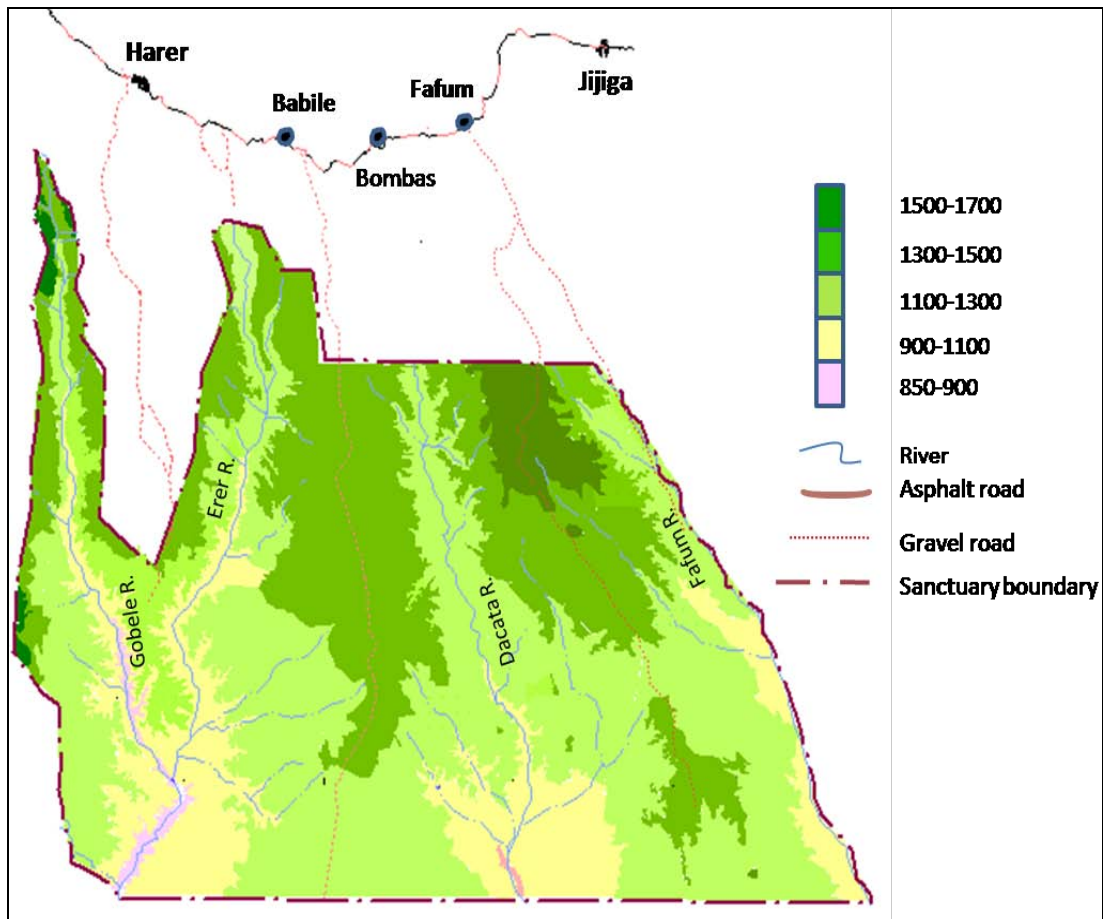
**Figure 4.2.** Map showing the altitudinal range of BES**.**

valleys, Gobele, which borders the eastern side of the Gara-Muleta Mountain, is unique as it forms a gorge of more than 600 m depth (Stephenson, 1976). Dakata Valley is broader, less deep and more gentle than Gobele Valley. However, the Fafum Valley has broader floor than that of the Dakata Valley but also has hilly sides. The Gobele and Erer Valleys with their tributaries comprise most of the rugged lands of the sanctuary (Yirmed Demeke *et al*., 2006).

The natural features of BES also include spectacularly arranged rock outcrops in addition to the rich vegetation and variety of wild animals (Demel Teketay, 1995). The other main characteristic feature which is close to the BES is the Gara-Muleta Mountain which rises over 3,400 m asl. Thus, the topography of the sanctuary can be categorized into flat,

gentle slopes and deep valleys and gorges covering 84% and 16% of the sanctuary, respectively (Yirmed Demeke, 2009).
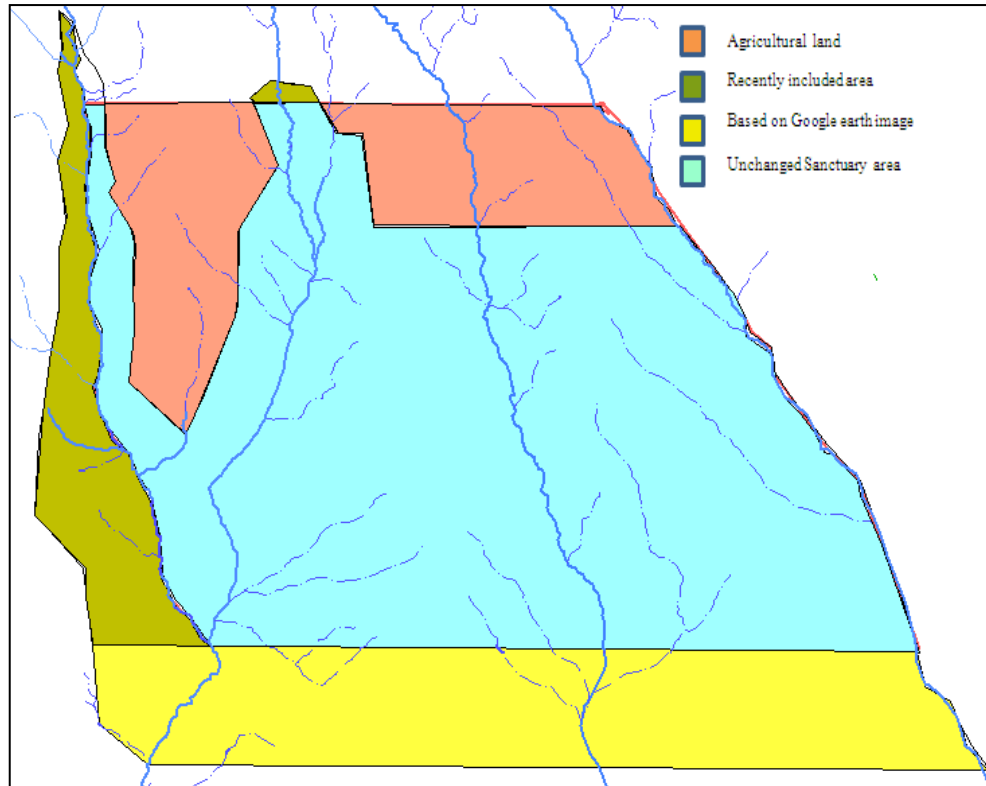


**Figure 4.3.** Proposed map of BES showing exclusion and inclusion of areas from the current boundary of the sanctuary (WSD and EWCA, 2010).

### 4.1.1  History of establishment

In 1963 and 1965, two UNESCO (United Nations Educational, Scientific and Cultural Organization) missions visited Ethiopia and made a number of surveys to identify potential wildlife areas for the establishment of NPs, sanctuaries and wildlife reserves. Based on their suggestions, an institution to establish and manage PAs was established in 1965 and legally recognized in 1970 (Negarit Gazeta No. 4, 1970) and subsequently, a number of PAs including BES were established in different categories. Before the establishment of BES, the present area of the sanctuary and its surrounding was

designated as Harer-Wabi Shebelle CHA for sport hunting. Permits for sport hunting were issued by the Hunting License Office established under the Ministry of Agriculture in 1944 by the Imperial Majesty Haile Selassie (Negarit Gazeta No. 9, 1944). The African Elephants and Lions were the two major species hunted in the region.
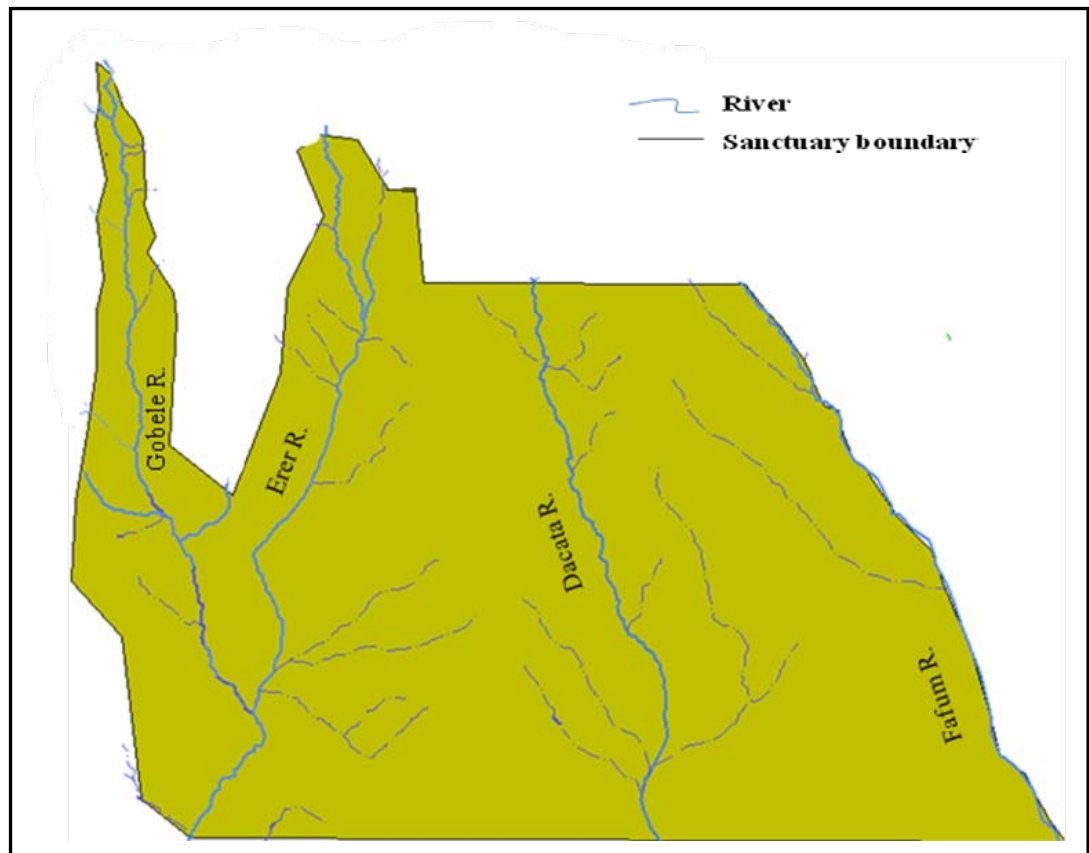


**Figure 4.4.** The new proposed map of BES (Source: WSD and EWCA, 2010).

The continued hunting pressure on these animals for two decades and crop raiding conflicts between Elephants and the local people raised concerns on the survival of these species. In 1968, the crop raiding conflicts of Elephants were reported to the Emperor Haile Selassie during his visit to the Fafum Valley (Stephenson, 1976). This resulted in issuance of an order by the Emperor for the designation of the BES in 1970. This edict was a significant measure that would assist the protection of the diminishing population of Elephants in the area. This upgrade of a CHA to a sanctuary helped to ban legal

hunting of big game animals in the new PA. The remaining area was designated as Chercher-Highland CHA in the West and Harer-Wabi Shebelle CHA bordering the sanctuary in the North, East and South of the sanctuary (Figure 4.5). At present, both these CHAs are not functional. An aerial survey conducted in 1975 revealed that the proposed sanctuary covered the distribution range of the Elephants fairly well at the time (Stephenson, 1976). Regardless of its national and international significance for the protection of African Elephants, BES to date has not been gazetted.

The sanctuary is under category IV of IUCN (a protected area managed mainly for habitat/species management) with a primary objective to maintain, conserve and restore particular species or habitats through management intervention (IUCN, 1994). According to IUCN (1994), such protected areas need regular and active interventions to address the requirements of a particular species or habitats. However, BES has received the least attention for conservation since its establishment (Stephenson, 1976; Yirmed Demeke, 2006; Anteneh Belayneh and Feaven Workeye, 2008) although it has been designated as the largest sanctuary for Elephants (6,982 $km^2$) in the country (Stephenson, 1976). During its establishment, the impact of people in terms of settlement was relatively insignificant except the Somali pastoralist who use the rich pasture for seasonal livestock grazing (Mihiret Ewnetu *et al*., 2006). However, reports were building up that discussed growing competition between humans and Elephants for space and critical resources. Elephants resided in this place much earlier than sedentary human existence (Stephenson, 1976). The sanctuary is increasingly suffering from settlement, intensive agriculture and livestock grazing, and the effective size and quality of the sanctuary for conservation of biodiversity has been reduced due to the huge immigration of farmers and their livestock who are permanently settled in and around the sanctuary (Hillman, 1993; Yirmed Demeke *et al.,* 2006).
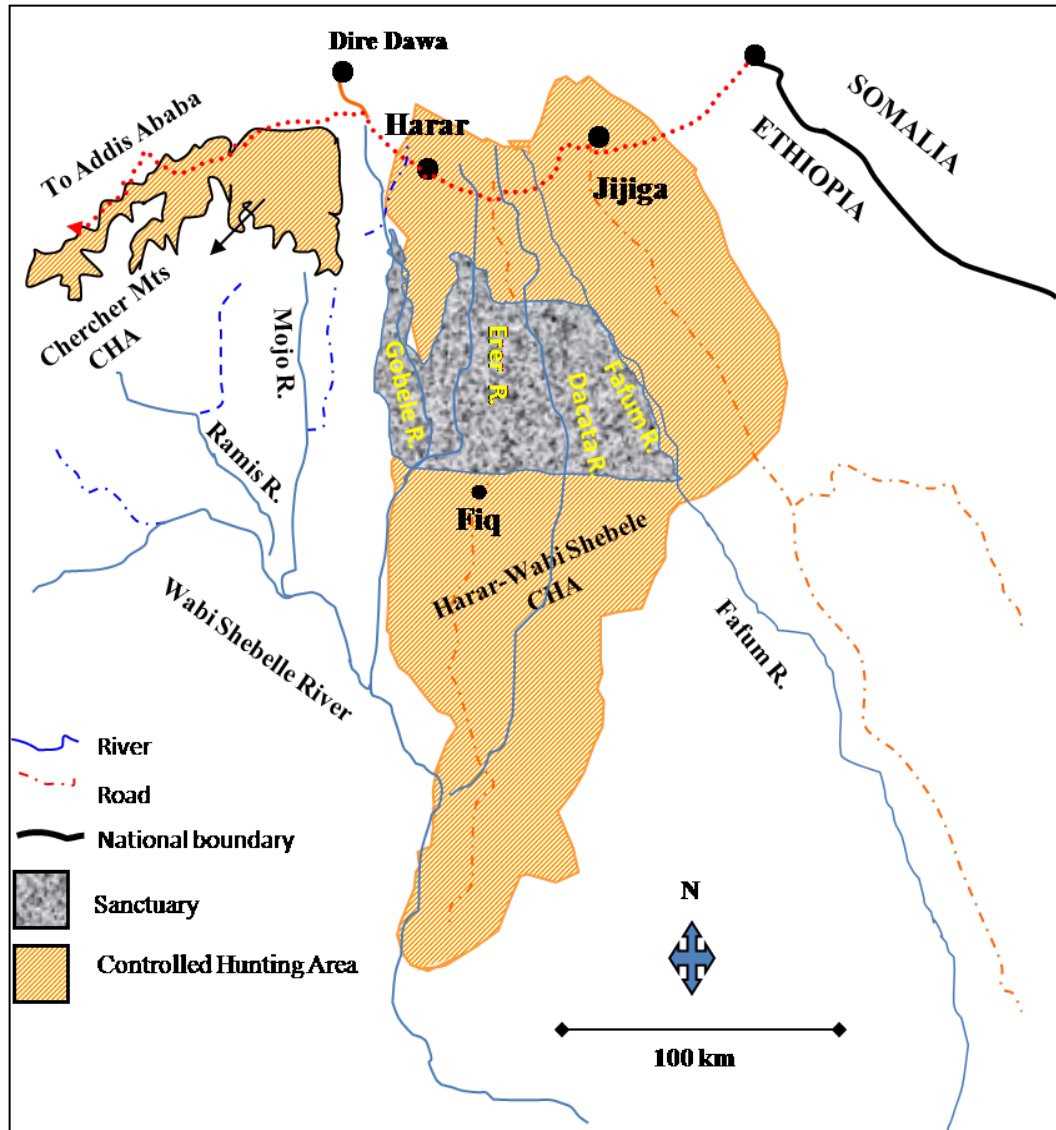
**Figure 4.5**. The proposed sanctuary and the surrounding controlled hunting areas.

### 4.1.2  Geology and soils

In Ethiopia, there are large exposures of Pre-Cambrian rocks forming the basement complex. This Pre-Cambrian complex underlies all other more recent rocks occurred especially in the central and eastern part of the country (Mohr, 1970). Of the two most

important rock-types forming the basement complex, the Wabi-Shebele River Basin is dominated by Mesozoic metamorphosed sedimentary formations, with some volcanic rocks in the northwest of the basin and isolated ridges and hills (Abebe and Foerch, 2006). The important rocks around Harer are sedimentary in origin and highly metamorphosed exposures of silicate-chlorite quartzite, magnetite-quartzite and graphitic quartzite (Mohr, 1964).

According to Mohr (1964), gneiss, though not common in the Ethiopian basement complex, it finds its best development in various areas of Harer. Muscovite-biotite, amphibole and chlorite-epidote gneiss are the three most abundant types of gneiss in the vicinity of Harer and Jijiga. In addition to the sedimentary formations in the basement complex, granite is the most abundant, un-metamorphosed intrusive igneous rock in eastern Harer. In this area, upon the underlying Basement Complex rocks, there is the basal Mesozoic Sandstone, which is termed as the Adigrat Sandstone. The Adigrat Sandstone in the Harer region has smaller thickness compared with that in the northern and central Ethiopia. However, the preservation of the upper Sandstone is rare in Harer areas; rather basalts are observed resting directly on Jurassic limestones or lower horizons along the Dire-Dawa-Jijiga road. In Harer and Dire-Dawa area, limestone, granite and gneiss have been used for building purposes.

Wabi-Shebele River Basin, which includes Erer, Dakata and Gobele Valleys of BES, is among the country's salt affected areas (Lisanework Nigatu *et al*., 2007). In general, the soil types of BES and the surrounding areas include cambisols, luvisols, nitosols, orthic solonchakes, fluvisols, vertisols and xerosols (Mohr, 1964). At the sharply sloping hill tops and hill sides, there are rock outcrops. As the slope decreases, lithosols/leptosols/rendzinas, regosols (entisols), luvisols (alfisols) and cambisols occur in this order. In the flat valley bottoms, alluvial and colluvial origin soils such as fluvisols (entisols/inceptisols) are predominant followed by heavy clay vertisols found nearby the marshy and swampy areas of the valleys.

### 4.1.3 Water resources

Water is the most critical resource for people, livestock and wild animals in the eastern parts of the country. The arid and semi-arid areas of Jijiga Zone (Somali Region) and Eastern Harerghe Zone (Oromia Region), where BES is located, are rainfall-deficient areas and affected by frequent droughts. However, there are four main rivers rising from Gara Muleta-Gursum highlands and flow southwards through the sanctuary to join Wabi Shebelle River Basin: Gobele, Erer, Dakata and Fafum Rivers (Figure 4.4). Especially, Gobele, Erer (Erer Guda and Erer Tika), and Dakata Valleys have limited permanent flowing water sources for Elephants (Stephenson, 1976). Permanent water is also available in Erer Valley, which flows only for about three km around the junction of Erer Guda and Erer Tika Valleys during the rainy season. Most of the water sources for Elephants are in the middle Erer Valley at the confluence of the Erer Guda and Tika. However, there is not enough perennial water during the dry season for Elephants in the upper Erer valley Elephant from November to mid March (Yirmed Demeke, 2009).

Areas in and around BES also have springs. Yirmed Demeke (2009) has found that 15 (out of 20) springs were used by Elephants. For example, when the Erer Valley water dries up in November, Elephants use Echube and Wolbi springs and other intermittent water sources found in the Erer temporarily until they move to the Gobele Valley. In addition, a few perennial springs are found in the Upper Gobele Valley in the evergreen scrub vegetation, which are used by Elephants during dry season from November to March.

Due to inadequate and inaccessible surface water during the dry season, people living in BES are forced to dig a number of wells along the river courses of the upper Erer and Gobele Valleys to use it for themselves and their livestock. The boreholes are fenced to protect it from being damaged by Elephants. Elephants also dig an average depth of 0.5 m in the loose sand along the same river courses.

### 4.1.4  Climate

The traditional agro-climatic zone of BES can be categorized as 'Woina Dega' (subtropical) and 'Qolla' (tropical) (Daniel Gamechu, 1977) due to altitudinal variations between the highlands (with altitude of 1,500-2,300 m asl) and lowlands (800-1,500 m asl), respectively. According to Lisanework Nigatu *et al.* (2007), BES is generally characterized by semi-arid climatic conditions. Yirmed Demeke (2009) stated that the sanctuary is characterized by arid and semi-arid climatic conditions with bimodal rainfall pattern. However, there is no long-term and complete climatic data recorded at different agro-climatic zones of the sanctuary to substantiate the conclusion of the different authors. Thus, the following description of rainfall and temperature is based on the data collected at Haromaya (2050 m) or Harer (1900 m) weather stations, which might be used to describe the weather conditions (rainfall and temperature) of the highland areas and that obtained from Babile (1650 m) or Bisidimo (1340 m) stations to explain the lowland areas of the sanctuary (Lisanework Nigatu *et al.*, 2007). Even these data are neither long-term nor complete to give the overall meteorological information for the study area.

According to Daniel Gamachu (1977), the Woina Dega and Qolla agro-climatic zones are characterized by an average annual rainfall of over 600 mm. Accordingly, based on 11 years (1995-2005) data obtained from Haromaya weather station, the annual rainfall ranges from 607 to 997 mm ((Figure 4.6), with mean annual rainfall of 781mm. Based on the eight year (1997-2004) data obtained at Babile town which is 15 km north of the old sanctuary's boundary, the annual rainfall ranges from 507 to 750 mm (Yirmed Demeke, 2009). In general, according to Lisanework Nigatu *et al*. (2007), the mean annual rainfall of BES is 703 mm, ranging from 452 to 1116 mm from year to year.

Based on the available rainfall data at Haromaya, the mean monthly rainfall ranges from 9 mm in December to 160 mm in August, and that of Bisidimo ranges from 1 mm in January to 109 mm in August (Figure 4.6). The months of November, December, January and February receive the minimum rainfall amount and that of April, May, July, August

and September receive the highest rainfall amount in both areas. This indicates that both areas might exhibit bimodal rainfall pattern. As shown in the climate diagram (Figure 4.7), the rainfall pattern recorded at Haromaya Weather Station is clearly bimodal - occurring from April to May (short rainy season) and July to October (long rainy season). Due to lack of complete temperature data, it is difficult to be certain for that of Bisidimo.
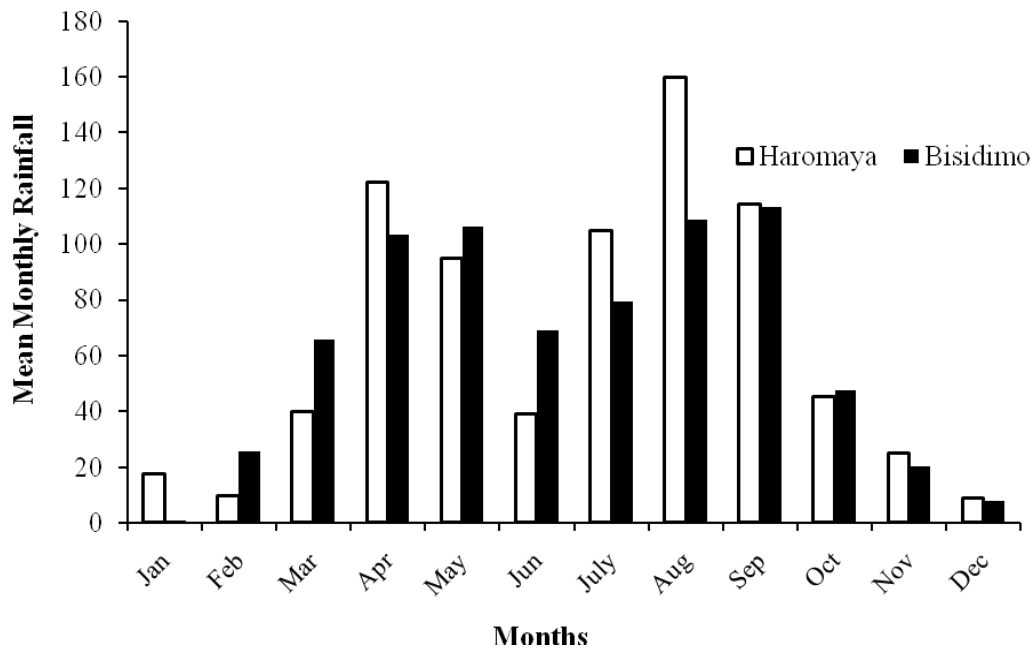


**Figure 4.6.** Mean monthly rainfall (mm) at Haromaya and Bisidimo (Source: Lisanework Nigatu *et al*., 2007).

According to Daniel Gamachu (1977), the Woina Dega agro-climatic zone exhibits temperatures ranging from 16 to 20 in the coldest months and from 20 to 24 in the warmest months and that of Qolla from 20 to 24 in the coldest months and 24 to 28 in the warmest months. The mean monthly temperature at Haromaya (representing the highland areas) and Bisidimo (representing the lowland areas) ranges from 12.9° - 19.1°C and from 13.5°C - 30.9°C, respectively (Figure 4.8). The maximum and minimum temperatures of Haromaya range from 22.2°C in December to 24.7°C in May and from

3.6°C in December to 13.8°C in June, respectively. The coolest temperatures at Haromaya happen during October to February while the warmest temperatures prevail during May and June. For Bisidimo, the maximum temperatures range from 28.9°C in July to33.4°C in March (the minimum temperature data is missing). The months from October to February are the coolest while May and June are the warmest months of the year at Haromaya.
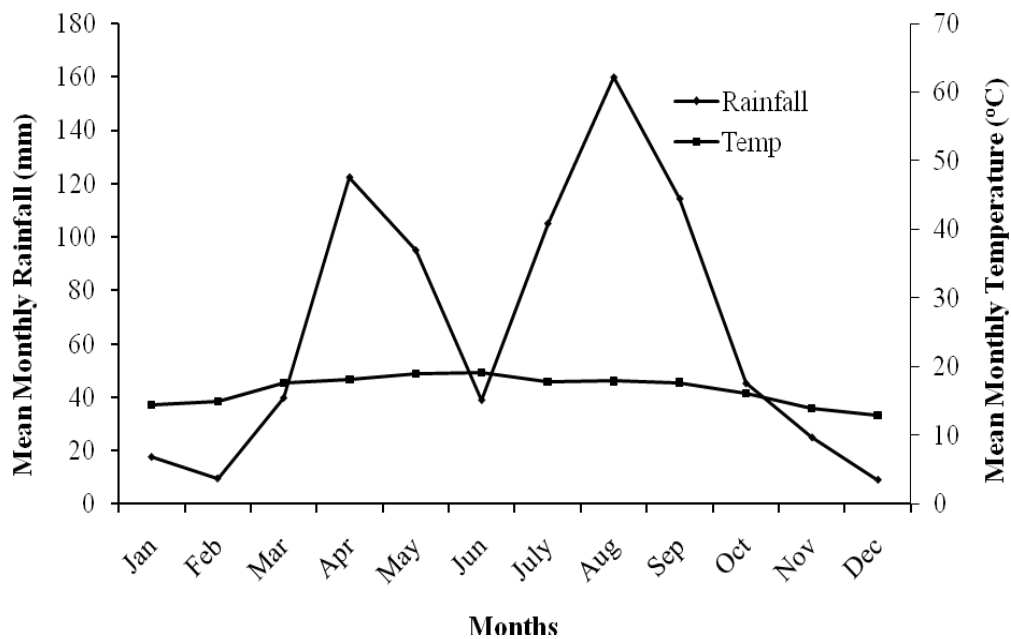


**Figure 4.7.** Climate diagram of Haromaya Weather Station, 1995 to 2005 (Source: Lisanework Nigatu *et al*., 2007).
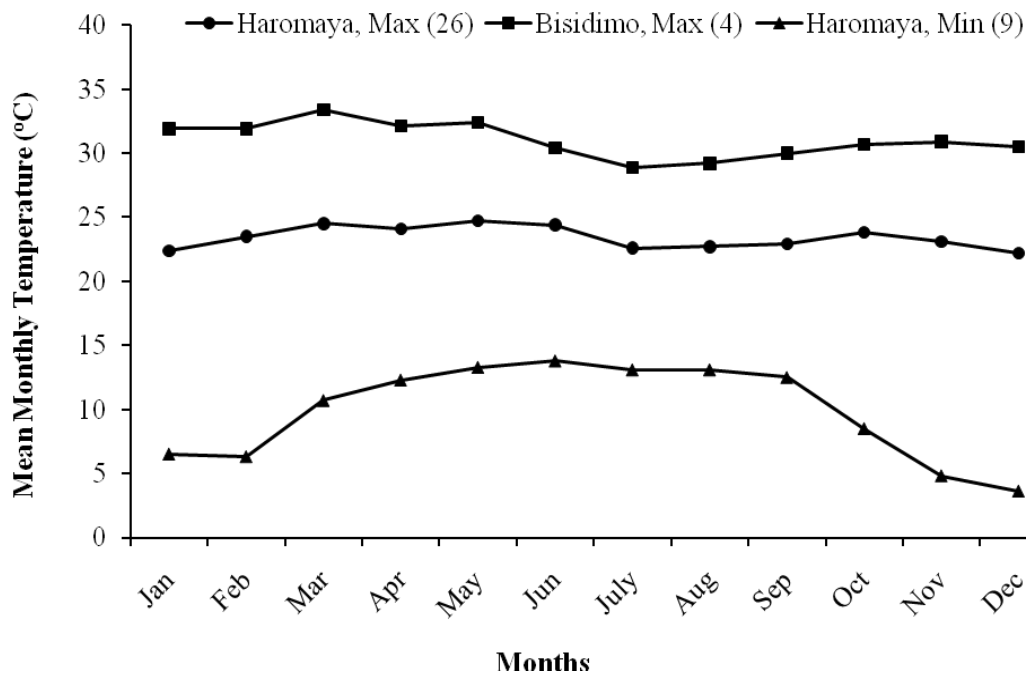
**Figure 4.8**. Average monthly maximum and minimum temperature at Haromaya and Bisidimo (minimum temperature data for Bisidimo is missing). Numbers in parenthesis indicates number of years. Source: Lisanework Nigatu *et al.* (2007).

### 4.1.5   Wildlife resources

*4.1.5.1   Flora*

It was reported that some 80 years ago, the majority of the Harer highlands were forested providing habitat and food for numerous free-roaming Elephants. Currently, the forested areas are declining due to human and livestock population growth, and related activities such as tree-felling for fire wood and construction and charcoal making for energy production. Based on the findings of the only, but systematic vegetation studies by Demel Teketay (1995) in Dakata Valley and more recently by Anteneh Belayneh (2006) in Erer Valley, BES was found to be rich in plant diversity. The two studies recorded 202 and 238 plant species in Dakata and Erer Valleys, respectively. From the 202 species recorded in Dakata Valley, a tree species called *Erythrina burana,* and a herb species

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called *Pelargonium erlangerianum* are endemic to Ethiopia, and 18 other species are restricted to only two or three countries. From the study conducted in 2007, a total of 52 woody plant species were also recorded in BES (Zelealem Wodu, 2007).

The BES consists of *Acacia-Commiphora* woodland, semi-desert scrubland and evergreen scrub ecosystems. At lower elevations where the rainfall is less consistent, the vegetation becomes semi-desert scrubland (EWNHS, 1996). In general, the vegetation of BES can be categorized into three major vegetation types (Figure 4.9): *Acacia* forest/woodland along river banks, *Acacia-Commiphora* Woodland in lowlands and mid-highlands, and Bushland/scrubland or thickets (Stephenson, 1976; Lisanework Nigatu, *et al*., 2007; Zelealem Wodu, 2007; Yirmed Demeke, 2009). The dense Acacia forest/woodland, which covers only about 0.7% of the sanctuary, is mostly found in the bottom of the upper Erer and Gobele Valleys and its composition become sparse in areas further away from the valley bottoms depending on the soil nutrient richness and the soil moisture content. Some remnants of the *Acacia* forest are found in some areas of the Erer Valley but with insignificant proportion (Lisanework Nigatu, *et al*., 2007). According to Yirmed Demeke (2009), these forested areas in the upper Erer and Gobele Valleys are the major habitats for Elephants providing protection and shade after foraging in the adjacent open areas. The riverine vegetation in upper Erer and Gobele Valleys is dominated by woody species such as *Acacia robusta, A. brevspica, Balanites aegyptiaca, Tamarindus indica, Oncoba spinosa, Acokanthera schimperi, Opuntia ficus-indica, Grewia bicolor, Capparis tomentosa* and *Terminalia spinosa* (Anteneh Belayneh, 2006). The herbaceous vegetation is comprised of *Acyranthus aspera, Plumbago zeylanica, Solanum nigrum, Abutilion bidentatum,* and *Panicum monticolum.*

The *Acacia-Commiphora* Woodland vegetation occurs in the upper Dakata Valley. According to Stephenson (1970), the woodland is also composed of the same tree species as the *Acacia* forest but shorter in height. The *Acacia-Commiphora* is composed of drought resistant tree, deciduous shrubs, and broad-leaved trees and shrubs such as *Combretum* spp., *Terminalia* spp. and *Balanites aegyptica* (Demel Teketay, 1995; Yirmed Demeke, 2009). More open woodlands occur on the upper broader plateau
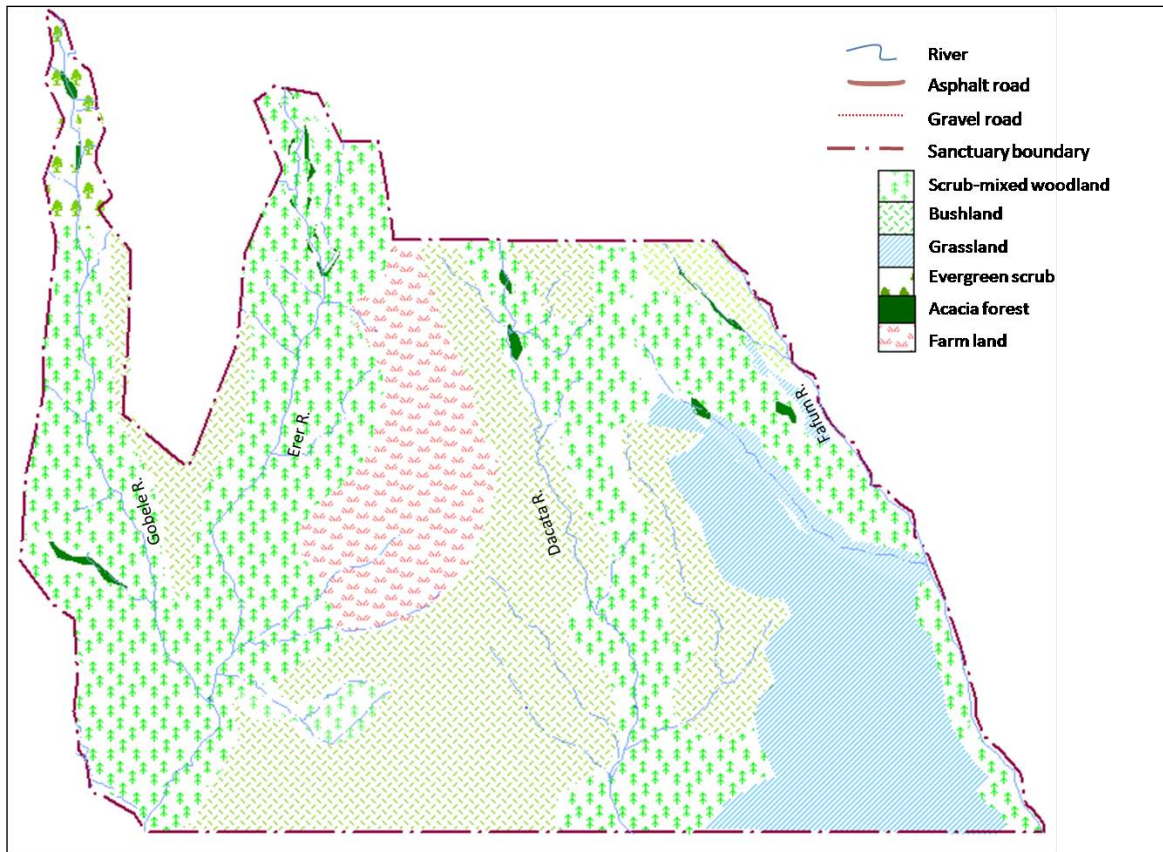
**Figure 4.9.** Vegetation classification of BES (Source: WSD, 2010).

between Gobele and Erer Valleys (Lisanework Nigatu, *et al*., 2007; Yirmed Demeke, 2009). This woodland is the major habitat providing cover and food for Elephants (Stephenson, 1970). The woodlands are densest and most extensive in the valley bottoms and become sparser and poorer in composition as it progresses south wards. Dakata Valley contains a good example of *Acacia* woodland which contains a grass swamp and an extensive *Acacia seyal* and Combretaceous woodland (Demel Teketay, 1995). According to Demel Teketay (1995), the main tree species in Upper Dakata Valley include *Acacia tortilis*, *A. clavigera, A. seyal*, *A. zanzibarica, and Tamarindus indica*.

The bushland/scrubland vegetation type occurs in the valley bottoms, ridges and plains continuing from the *Acacia* forest and *Acacia-Commiphora* woodland vegetation types. It is composed of *A. mellifera, A. nilotica, A. Senegal, C. Africana, C. abyssinica, C.*

*opobalsamum, Terminalia spinosa,* and *Boswellia* sp. (Demel Teketay, 1995). According to Stephenson (1976), this vegetation type has no value as cover and little values as food for Elephants. According to EWNHS (1996), the bushland and thicket vegetation such as *Euphorbia spp.* and *Adenia aculeatea* covers the hillsides and small plateaus. In addition, the evergreen and/or semi-evergreen scrub species such as *Dodonia viscosa* and *Carissa edulis* is also part of the bushland vegetation (Yirmed Demeke, 2009).

It is important to mention that there are four invasive species within the sanctuary: *Opuntia ficus-indica, Parthenium hystrophorus*, *Lantana camara,* and *Prosopis juliflora. Opuntia ficus-indica* grows from the river banks up to the hills of both upper valleys of Erer and Dakata rivers. It is an important fodder for Elephants from April to late September. *Parthenium hystrophorus and L. camara* are distributed all over the place growing around human settlements and cultivation. *Prosopis juliflora*, a nationally declared noxious invasive species is also introduced in the sanctuary; however its distribution is very limited.

### 4.1.5.2 Fauna

**Mammals**

Based on a recent study, the sanctuary harbors 30 species of mammals belonging to seven orders and 15 families (Yirmed Demeke, 2009; Appendix 1). The major wildlife species protected in the sanctuary are African Elephant (*Loxodonta africana africana*), Black-manned Lion (*Panthera leo*), Leopard (*Panthera pardus)*, Greater Kudu (*Tragelaphus strepsiceros*), Lesser Kudu (*Tragelaphus imberbis*), Menelik's Bushbuck *(Tragelaphus scriptus meneliki)*, Anubis Baboon (*Papio anubis*), Hamadryas Baboon (*Papio hamadryas)*, Salt's Dik-dik (*Madoqua saltiana*), Aardvark (*Orycteropus afer*) and Spotted Hyaena (*Crocuta crocuta*). The sanctuary is known for its population of the African Elephant. In 1975/76, extensive aerial surveys were conducted by Stephenson and the staffs of the Wildlife Conservation Organization to determine the population numbers, groupings and migratory trends of the African Elephants which includes all the four valleys, the surrounding mountainous areas, and the Wabi-Shebelle River from Imi

to Kelafo and El-Kere (Stephenson, 1976). Currently, the increasing human pressure and the Human-Elephant Conflict (HEC) put the future survival of this species at risk. The Dik-dik population in the *Acacia* scrubland is notably high.

**Birds**

Babile Elephant Sanctuary is identified as one of 73 Important Bird Areas of Ethiopia (EWNHS, 1996). Surveys indicated that there are about 191 species of birds identified in sanctuary (EWNHS, 1996; Yirmed Demeke *et al*., 2006; Appendix 2). Babile Elephant Sanctuary is also home for 27 Somali-Masai biome species and provides a habitat for the endemic Salvadori's serin (*Serinus salvadorii*) (EWNHS, 1996). The highland vegetation in the northern section of the sanctuary supports the Black-winged Lovebird (*Agapornis taranta*) which is restricted only in Ethiopia and Eritrea (EWNHS, 1996).

## *4.2 Socioeconomic Characteristics and Land-use Patterns*

**General**

Babile Elephant Sanctuary is heavily settled both inside and around its boundaries by a local farming and pastoralist community. High encroachment patterns are witnessed on the northern, north-western and western borders of the sanctuary where there are permanent farm holdings. Areas to the south, south-east and east have less human density per unit area and are largely inhabited by Somali pastoralists. The presence of these settlements and the land use systems are regarded to be incompatible with conservation of the relic Elephant population whose home ranges extend to a wide spectrum of habitats both within and outside the protected area. Elephants come into conflict with local communities and there are incidences of crop raid and human death from time to time. Increasing numbers of people especially from Fedis and Babile-Oromia Woredas have taken illegal land holdings inside Erer Valley. With limited growing period in the year, the dry and hot climate of Babile is not favorable for optimum crop production. This problem is forcing inhabitants to clear more and more land to support agriculture for

growing families. The hunger for energy consumption is totally dependent on fuel wood and this is extracted from remaining trees and conversion of wood into charcoal.

Local people also practice mixed agriculture where they raise livestock. The most common domestic animals are cattle and grazing is a predominant activity. Browsers, especially camels, are in direct competition for resources with the Elephants. The presence of people who try to survive in the dry climate of Babile has become a peril to Elephants as well as biodiversity of the area. This section attempts to shed light on the demographical characteristics, land use practices, economy and presence of social services in and around BES.

### 4.2.1 Demography

Yirmed Demeke (2009) points out that population growth in eastern Ethiopia generally show a growing trend with a tendency for higher density in predominantly agricultural areas. Figures vary from woreda to woreda with a range of 406.5 persons per km$^2$ in Haromaya Woreda in the north to 6.7 persons per km$^2$ in Meyu Muluke Woreda in the south-west (Yirmed Demeke, 2009). Average household size for a rural area is estimated to be 5.4 persons. According to a population and housing survey of 1994, a five year assessment (1990 – 1995) showed that the population of Babile Woreda has shown an increment of 47.8% (Yirmed Demeke, 2009).

### 4.2.2 Settlements

Babile Elephant Sanctuary is geographically located in three administrative zones. Two of these zones, Fiq and Jijiga are within Somali National Regional State and one, Eastern Harerghe Zone is within the Oromia National Regional State (Yirmed Demeke, 2009). A total of twelve woredas are found either inside or adjoining the sanctuary. They are Haromaya, Babile-Oromia, Babile-Somali, Fedis, Girawa, Gursum-Oromia, Meyu Muluke, Kurfa Chele, Dihun, Midega Tola, Fiq and Jijiga. Seven of these districts are found in the northern and western side of the BES within Oromia Regional State. Four are found in the west and south and one in the east. A total of 63 villages in three woredas

are found wholly in the BES (Mihret Ewnetu *et al.*, 2006). The most heavily settled areas are the Valleys of Gobele and Erer Rivers. Elephant contact with humans is encountered wherever there are heavily settled areas across Gobele River on the periphery of the sanctuary, the northern and north-western corner of the sanctuary, in the Erer Valley, and along the track that leads from Babile to Fiq.

Population figures are not available for all woredas in the three Zones. Population structure for East Harerghe Zone in five woredas of Gursum, Babile, Fedis, Kurfa Chele, and Girawa (Table 4.1) shows that there is almost 1:1 ratio in female and male inhabitants in rural areas. Combined population for rural and urban areas shows that the female: male ratio is nearly 6:4. There is preponderance of a higher rural population compared to urban dwellers. The most highly populated woreda amongst these is Girawa with a population estimate is over 241,000 persons. Out of this, about 2.4 % is urban while the rest 97.6% is rural. In Gursum about 92.6 % is rural while 7.4 % is urban. In Babile, the rural population is about 92 % while that of the urban is 8%; in Fedis about 91.6 % is rural while the rest 9.6% is urban; and in Midega Tola urban population is about 9.2 % while the rural is 91.8 %.

**Table 4.1.** Human population figures in and around BES (Source: Population and Housing Census Results, 2007).

| Woreda | Urban & Rural | | | Urban | | | Rural | | |
|---|---|---|---|---|---|---|---|---|---|
|  | Both sex | Male | Female | Both sex | Male | Female | Both sex | Male | Female |
| Babile | 93,674 | 47,153 | 46,521 | 17,704 | 8,782 | 8,922 | 75,970 | 38,371 | 37,599 |
| Girawa | 241,036 | 122,178 | 118,858 | 5,891 | 3,384 | 2,507 | 235,145 | 118,794 | 116,351 |
| Fedis | 114,421 | 57,934 | 56,487 | 4,573 | 2,345 | 2,228 | 109,848 | 55,589 | 54,259 |
| Gursum | 154,853 | 78,636 | 76,217 | 12,027 | 6,220 | 5,807 | 142,826 | 72,416 | 70,410 |
| Kurfachelle | 58,712 | 29,675 | 29,037 | 5,763 | 3,034 | 2,729 | 52,949 | 26,641 | 26,308 |
| Midega Tola | 75,804 | 39,012 | 36,792 | 6,055 | 3,132 | 2,923 | 69,749 | 35,880 | 33,869 |

### 4.2.3  Land use patterns

Land use can be classified in three categories. The major ones are cultivation, grazing, forest and/or bushland (Mihret Ewnetu *et al*., 2006).

**Cultivation**

Stephenson (1976) noted that no cultivation existed up to three years after the establishment of the sanctuary. The sanctuary was established more than 40 years ago and arable agriculture is an activity that has grown with it. Cultivation now is a major activity for a number of farming communities both inside and on the periphery of the BES. Agriculture is basically subsistence with various cereals, fruits and cash crops. The major cereal grown in the valleys is maize while sorghum is sown on higher ground. Main fruits grown include mangos and bananas while cash crops are represented by chat, pepper and tobacco. Vegetables are also present and farmers grow tomatoes, sweet potato and pumpkin widely. Peanuts are particularly prolific in this region for which the soils and climate of the valleys appears to be very suitable. Though this sanctuary was established on the edict of the Emperor Haile Selassie I, there was little concern about the consequences of having farms and farming communities inside and around the protected area since its inception. In fact the large Erer-Wabi-Shebelle Haile Selassie I Foundation Welfare farm was situated on the north-west corner of the sanctuary with little regard to future negative impacts (Mihret Ewnetu *et al*., 2006).

**Grazing**

Grazing is the oldest and one of the most important land use system in the area. Its effects are insidious regarding its impact on biodiversity. It dates back much earlier than the arable cultivation practiced by sedentary farming communities. In earlier years, Somali pastoralists made use of the area on a seasonal basis. This trend continues throughout the territory of the BES but is more pronounced in the south, western and northern parts of the area. In the earlier years of the establishment of BES, it was noticed that competition between pastoralists and Elephants was limited to the valleys (Stephenson, 1976).

Stephenson (1976) noted that there was peaceful coexistence between cattle and Elephants during those early years. This situation has now changed with the growth of human population in the area, influx of refugees, establishment of state farms and vlllagisation campaigns during the Dergue Regime (Yirmed Demeke, 2009). Yirmed Demeke (2009) also pointed out that with the takeover of highland areas between the fertile Erer and Gobele Valleys, competition for grazing has increasingly become intense.

The Elephants, in the absence of alternative sources of food moved up the valleys to be confronted by human interest leading to serious conflict. Yirmed Demeke (2009) in his Doctoral Thesis records that a study carried out in October 2004 which found out that there were at least 2,200 and 3,350 mean daily numbers of cattle and camels respectively in the Upper Erer Valley in direct competition with Elephants. While competition for forage and cover is obviously the main threat, Elephants are known to be easily disturbed as the result of invasion by livestock making them nervous and likely to attack with little or no provocation.

**Attitudes of Local Communities**

The attitudes of local communities with regards to the establishment of BES are not clearly known or more precisely, has not been sampled. From discussions with sanctuary management and a few opportunistic discourses with locals, it seems there are positive, ambivalent and at times negative perceptions toward the establishment of the sanctuary and the conservation of resources. However, Yirmed Demeke (2009) has been able to look at the perceptions and attitudes of local people towards the conservation and destructive behavior of Elephants. This study which was conducted with the idea of assessing HEC at BES, appreciates the reality that HEC at BES is for the most part influenced by locals who reside inside and in the vicinity of the sanctuary. The study looked at HEC specifically because it was realized that the intense conflict between Elephant survival and human interests has grown to a crux that it now is deemed to be the most debilitating factor to conservation at the site. A social survey which included 26 villages with a total of 685 respondents showed largely positive response towards

Elephants. Of the respondents, 74.9% resided outside the sanctuary while the rest 25.1% resided inside. The majority of respondents 71.2% (n=488) were positively inclined towards the conservation of Elephants while the rest 21.5% were not in favor of Elephant presence.

People had various reasons for the conservation of Elephants including the Elephant's role in opening up paths in the bush, being one of God's creatures, benefits from tourism and heritage value. Negative attitude towards Elephants was more frequent in areas surrounding the sanctuary and people believed that these animals were worthless as they attacked people, cattle and destroyed crops. In several instances local people were simply afraid of them and were negatively inclined towards their continued presence. While much has been done to understand the attitudes of local people towards the Elephant, perceptions towards the setup of the conservation area (BES) in general are believed to have greater implications on its future. This can be an important research topic that requires timely attention.

## 4.3   Policy and Legal Framework

**General**

Land is one of the most valuable assets of a nation on which all physical developments are implemented upon. Together with this, it is important to determine the best type of land use suitable to an area in terms of socio-economic characteristics and ecology. In Ethiopia, laws and legal frameworks that pertain to conservation and maintenance of protected area have slowly evolved through the years. The Constitution of Ethiopia refers to the rights of citizens to live in a clean and safe environment. Various relevant institutions work within frameworks and policies in the environmental protection arena. While policies and legislations are one thing, implementing laws and regulations are another matter. Although land can provide us livelihoods and development options for growth, our decisions can also alter long-term development if it is based on short term gain. Protection of the environment and conservation of sites like BES will ensure the

long-term gains to society at local, national and global levels. Strong and enabling laws and legislation with strong structure are necessary to ensure long-term protection of BES.

### 4.3.1. Institutional setup

Sustainable management of PAs is an area that requires different disciplines, professionals and practitioners who handle various management aspects. There is thus a need for collaboration to ensure that all these efforts contribute effectively to the same management objectives. In establishing conservation area institutions, the biophysical, protected area-level science and the policy-level legislation is usually taken into account. However, the institutional structure and behavior of organizations at all levels tends to be poorly stable and therefore not well developed. This is the situation that pertains in Ethiopia.

The history of wildlife conservation in Ethiopia began in 1909, when Emperor Menelik II declared the first wildlife law that prohibited the killing of wildlife especially big game mammals such as Elephants, Lions and Leopards without an official permission from hunting authorities (Tadesse Gebre-Michael *et al*., 1992). It was in 1965 that a government body called the Ethiopian Wildlife Conservation Organization (EWCO) was instituted to establish and manage the PAs of the country. There have been a number of institutional changes since its establishment. The former organization responsible for wildlife management, EWCO, went under ten different institutions since its establishment. This kind of continuous change does not create conducive environment for institutional strengthening and capacity building.

Before 1995, the management of all the protected areas was under the Federal Government body which was then called EWCO and is currently called the Ethiopian Wildlife Conservation Authority (EWCA). The proclamation (Proclamation 4/1995) that defined the duties and responsibilities of regional and federal governments gave regional states the responsibility to administer protected areas in their jurisdiction. By 1996, most protected areas were handed over to the respective regional governments with the

exception of two NPs and two wildlife sanctuaries. Following the study of Business Process Reengineering (BPR), the management of nine NPs returned to the federal government (EWCA) as per the criteria set under article 4, sub article 1 on the proclamation No 541/2007. Presently, eleven NPs and two sanctuaries (including BES) are administered by EWCA. Other national organizations concerned with environmental protection and biodiversity conservation include:

- The Federal Ministry of Agriculture and Rural Development – produce policies on land use, agriculture and forest conservation. These policies are intended to guide and complement those introduced at regional level.
- The Environmental Protection Authority (EPA) – responsible for some federal policy formulation such as the National Conservation Strategy.
- The Institute of Biodiversity Conservation (IBC) – a federal institution established mainly working on ex-situ conservation of biodiversity.

### 4.3.2. Legislations

Ethiopia has signed and ratified multilateral international conventions concerning the environment and biodiversity conservation which includes:

- The Convention Concerning the Protection of the World Cultural and Natural Heritage - The World Heritage Convention (October 1977),
- Convention on International Trade in Endangered Species of Fauna and Flora - CITES (July 1989),
- Convention on Biological Diversity (June 1992)
- African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968),
- Endangered Species of Wildlife Convention Commemorative Coins Regulation No. 65 of 1979,
- Convention on the Conservation of Migratory Species of Wild Animals. Bonn Convention, 1979,
- African-Eurasian Migratory Water Bird Agreement (Signed In 1995, The Hague).

The national laws that are currently applied to wildlife conservation in Ethiopia are:

- The gazettement notices for NPs: Awash NP (Order No. 54 of 1969 and Simien NP (Order No. 59 of 1969),
- Regulations for Wildlife Conservation (Legal Notice No. 416 of 1972 and No. 445 of 1974),
- Proclamation No. 192 of 1980 for Forest and Wildlife Conservation and Development,
- Proclamation No. 94 of 1994 to provide for the conservation, development and utilization of forests,
- Wildlife Development, Conservation and Utilization Proclamation No. 541/2007,
- Wildlife Development, Conservation and Utilization Regulation 163/2008,
- Ethiopian Wildlife Conservation Authority Establishment, Proclamation No. 575/2008.

Thus, the recent wildlife legislation in general reflects the changes that have occurred in Ethiopia over the past three years and provides an enabling framework for EWCA to address the underlying problems facing wildlife conservation in Ethiopia. However, there is loose relationship between the federal state and local communities mainly due to lack of sound structure to strengthen community–government partnerships over resource management. One especially problematic issue for BES is community use of natural resources within the sanctuary. In general, the legislation prohibits community use within NPs and sanctuaries as is outlined in the 2008 Wildlife Conservation Regulations (Legal Notice No. 163/2008, Article 5). However, there is legal support to work with communities in the other categories of protected areas to conserve wildlife resources as stated under Article 7 of Legal Notice No. 163/2008, which states as follows:

- *Local communities shall administer and develop community conservation areas and utilize wildlife resources therein.*
- *Local communities shall participate in ecotourism activities and use the income for the development of the communities.*

- *With approval of annual quota by the appropriate body, a local community may allow the hunting of wildlife in its conservation area by legally authorized hunters; and use the income for satisfying the basic needs of the community.*
- *The local community shall: by using its own funds or funds obtained from other sources, undertake development activities to improve the conditions of the wildlife conservation area; train personnel required for wildlife conservation; undertake development activities which are non-detrimental to the natural resources of the wildlife conservation areas; mobilize financial contributions and labor to support the development of the wildlife conservation area; determine utilization preferences in the wildlife conservation area in consultation with the relevant organ of the regional government.*

The emphasis of the above mentioned Article suggests that there may be an important opportunity to pioneer collaborative management approaches to community use areas in BES particularly south of the Midega Tola Town and eastern part of the sanctuary provided that such use is implemented in accordance with the management objectives of the sanctuary.

## 4.4. The African Elephant in BES

**General**

The African Elephant (*Loxodonta africana*) and its close relative - the Asian Elephant (*Elephas maximus*) originated in Sub-Saharan Africa during the early Pleistocene, and they are the last surviving species in the Order Proboscidae. *Loxodonta* remained in Africa while *Elephas* moved into Asia during the late Pleistocene (Maglio, 1973). The African Elephant is the world's largest terrestrial mammal and arguably the most charismatic mega-herbivore, providing a number of economic, ecological, cultural and aesthetic values for many nations. Elephants have complex social structures, astonishing intelligence and outstanding abilities to adapt to their surroundings. They are known to play a fundamental role in bionetwork stability as a keystone species in a given

ecosystem as their existence benefits many other fauna and flora and protects ecosystems and watershed on which human life depends.

African Elephant is distributed all over the African continent south of the Sahara and is capable of utilizing diverse habitats. It migrates over long distances in search of water and food and with little hindrance from ecological and geographical barriers (Figure 4.10). However, a rapid reduction in Elephant numbers and the ongoing destruction of their habitats have placed the African Elephants on the IUCN Red List of endangered species.
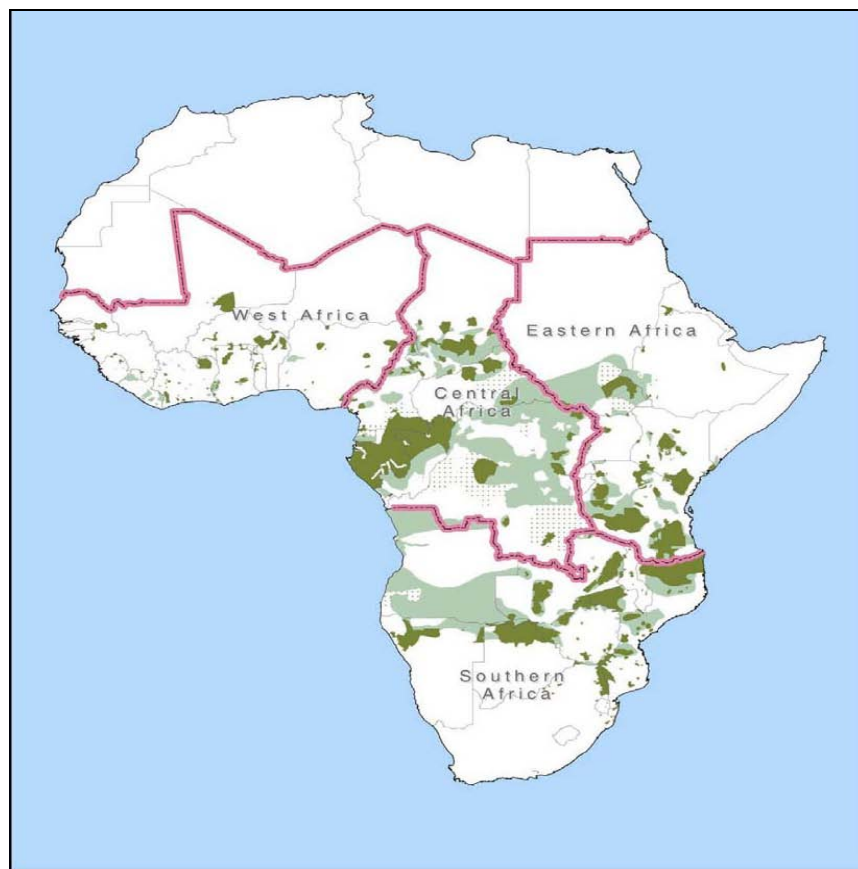


**Figure 4.10**. Current Elephant distribution in Africa (Source: Blanc *et al.*, 2003).

Elephant population decline in Ethiopia has been particularly dramatic due to poaching and conflict with humans (human population growth and hence the growing demand for land, resulting in loss of Elephant habitat). Accordingly, Ethiopia has lost about 90% of

its Elephant populations since the 1980s. In the 1980s the total Elephant population size for the country was estimated to be 8,700 heads. By 1990, this declined to 2,450 heads (Largen and Yalden, 1987).

At present, Elephants in Ethiopia are known to occur within and around one sanctuary, seven NPs and one controlled hunting area, namely BES, Geralle, Mago, Omo, Gambella, Chebera Churchura, Alatish, and Kafta Sheraro NPs and Dabus Controlled Hunting Area. In general, the present distribution of Elephants is limited to the periphery of the country, with the exception of isolated populations in BES and probably Chebera Churchura, the remaining populations are known to roam between countries. Elephants in Ethiopia inhabit a variety of habitats, ranging from the semi-arid environment in the Borana (Geralle NP in Southern Ethiopia) to the moist tropical forests in Chebera-Churchura NP in the southwest.

### 4.4.1. Elephant distribution and movement in BES

Babile Elephant Sanctuary is the last refuge for free ranging Elephants in eastern Ethiopia. According to Stephenson (1976), the sanctuary was within the Harer-Wabi-Shebele Hunting Area that extended as far as Wabi Shebelle River until Emperor Haile Selassie issued an order for the designation of the present conservation area in 1970. The Emperor decided on the establishment of the sanctuary following the report of crop-raiding conflicts during his visit to the Fafum area of eastern Ethiopia. Reports also reached him that Elephants within the valley were stressed and required attention. As a result, BES and two CHAs (Chercher-Highland and Harer-Wabi Shebelle) were established and delimited from the earlier vast Harer-Wabi Shebele CHA (Figure 4.5).

Long-term data on Elephant's movement and distribution in BES and surrounding areas are lacking except limited data collected by few researchers and reports (Stephenson, 1976; Yalden *et al.,* 1986; Largen and Yalden, 1987; Yirmed Demeke, 2009). The available data revealed that Elephant population in BES inhabited the thicket plains and the dry lowlands of eastern Ethiopia and adjacent northern Somalia (Figure 4.11).

According to Largen and Yalden (1987), the population was widely distributed and was common between altitude of 850 m and 1,850 m asl at Gara Muleta Mountains in the west.

Stephenson (1976) categorized the movement patterns of Elephants of the sanctuary in two distinctive groups. The first group, primarily inhabiting the eastern side of the sanctuary, used to move seasonally north-south between Wabi Shebelle (South) and Fafum and Dakata Valleys. The second group, used to move seasonally between the Erer and adjacent Gobele, Chulul and Mojo Valleys. However, recent studies showed the considerable reduction in Elephant range size believed to be because of the increasing demand for agricultural land and progressive development of settlements, coupled with commercial poaching (Yirmed Demeke, 2009). More incidents have also occurred during the Ethiopian-Somali war as poaching increased by Somali hunters, and refugee settlements were established in the Upper Fafum and Erer Valleys. As a result, Elephants have been steadily pushed to the west.

Recent studies by Yirmed Demeke (2009) witnessed that Elephants of the sanctuary have two major groups or clans based on their movement patterns and their associations to each other, which are named as the Gobele and Erer groups both roaming within and out of the sanctuary following three major movement patterns. One of the current Elephant route is along the Erer Valley in a north-south direction and known to move up to 10 km north of the sanctuary during rainy season and move south in dry season but occasionally return to the Upper Erer Valley. The second Elephant route (Gobele group) starts from the Erer Valley and extends to west to the Gobele Valley in the north--south direction for about 85 km and known to cross the boundary of the sanctuary to the north for about 12 km (Yirmed Demeke, 2009). The third Elephant movement (unidentified group) is to the east and southeast up to Dakata Valley, and known to occur from April to May and October to November, between Dendema and Dewreta and Ali Ethiopia and Minader, and Burka Bombe and Shinile Villages (Yirmed Demeke, 2009) and the Dakata Valley is believed to be the eastern limit of current Elephant movement and distribution

but the south eastern destination is not yet known due to inaccessibility and security reasons (Figure 4.12a, b).
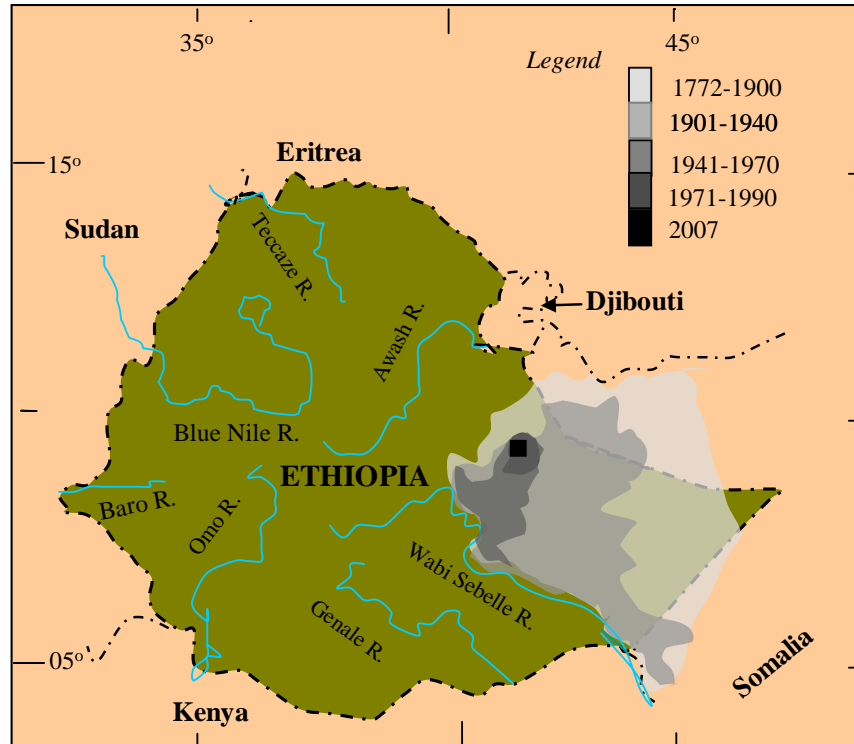


**Figure 4.11.** Historical distribution of the eastern Ethiopian Elephant population (Adopted from Yalden *et al*., 1987 and Yirmed Demeke, 2009).

The major reasons for Elephant movement in the two valleys are believed to be availability of permanent water, food, and relative absence of poaching. Accordingly, Elephants are known to move to the upper Gobele valley during the peak dry months, where green vegetation is found along the riverside and move south from late March onwards and then westwards to Erer and Gobele Valleys. Both Elephants and people are known to use water resources along the Erer and Gobele Valleys during dry season and this has become a major source of conflict. Some people also cultivate along the two river valleys within the Elephant range.
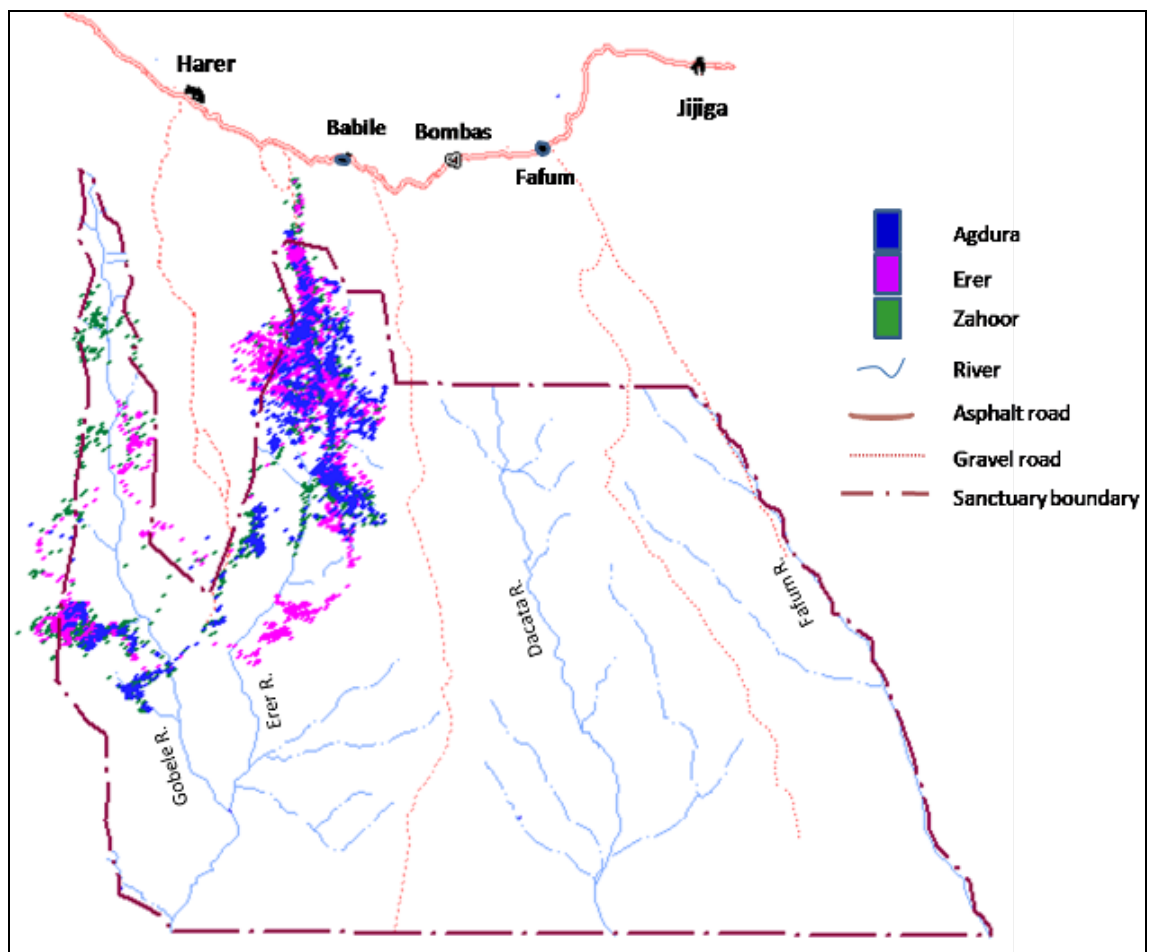
**Figure 4.12a.** GPS satellite tracked Elephants in BES from August 2009 – March 2010.
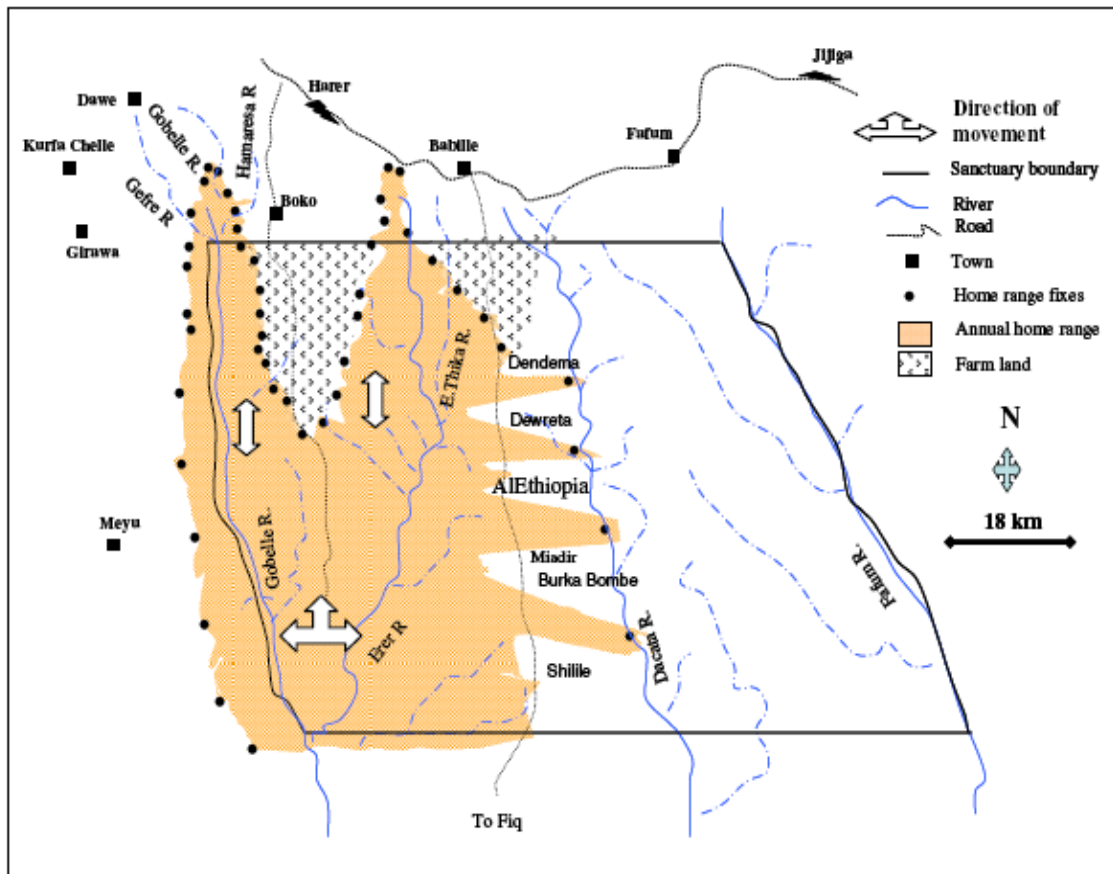
**Figure 4.12b.** Annual home range of Elephants in and adjacent areas of BES (Source: Yirmed Demeke, 2009).

### 4.4.2. Elephant habitat assessment

According to Yirmed Demeke (2009), the vegetation type seasonally visited by Elephants are *Acacia-Opuntia ficus-indica* mixed plants, bush land/scrub land, *Acacia* forest, and *Acacia-Commiphora* woodland, edge of farms and valleys floor/Typha reeds. Their favored habitat appears to be *Acacia-Opuntia ficus-indica* mixed plants, bush land/scrub land, *Acacia* forest, and *Acacia-Commiphora* woodland and habitats of edge of farms. Seasonal habitat assessment reveals that Elephants prefer valley floors with *Typha reeds* during dry season. This is believed to be due to the availability of green vegetation,

watering points and less human disturbance. On the other hand, in rainy season, Elephants prefer *Acacia-Opuntia ficus-indica* mixed vegetation and edge of farms (Yirmed Demeke, 2009). Elephant habitat in BES is lost as a consequence of expanding human activities along the valleys, as existing villages and farms grow or new ones are created. New towns and roads encourage settlement in remote areas; when development projects create commercial agriculture such as oil-palm plantations

Elephants' habitats are also degraded by domestic livestock grazing, woodcutting, human encroachment, and burning in the dry season. Scattered farms and other types of adverse human activities within the BES are believed to be the main causes of disturbance that discourages Elephants from using the whole area. The most important variable determining Elephant densities is the degree of protection (Burrell and Douglas-Hamilton, 1987). However, many Ethiopian Elephant ranges, particularly in BES are not well protected.

### 4.4.3. Elephant population estimate and its trend

The estimates of Elephant population in BES are mostly based on educative guesses, sporadic itinerary reports of early explorers and sightings by local residents and limited researchers. Although scientific data are inadequate, the existing data illustrate how the formerly widespread Elephant population is confined within the Gobele and Erer Valleys and their population reduced significantly. The available data on Elephant population estimates and historical ranges in eastern Ethiopia revealed that Elephants used to have wider distribution as far as northern Somalia. The numbers of Elephants counted or estimated by various researchers are indicted in Table 4.2 (adopted from Yirmed Demeke, 2009).

**Table 4.2.** Population estimate of Elephants from 1968-2007.

| Year | Population estimate | | Source |
|------|------|------|------|
| | **Count** | **Speculative** | |
| 1968 | 130 | 600 | Ingerson,1968 |
| 1972 | - | 600 | Stephenson,1976 |
| 1975 | 121 | 200 | Andeberhan 1975; Stephenson,1976 |
| 1976 | 136 | 200 | Stephenson,1976 |
| 1986 | - | 300 | Largen and Yalden, 1987 |
| 1990 | 65 | 100 | Stephenson, 1976, Allen-Rowlandson,1991; |
| 1998 | 65 | 65 | Tekle,1998 |
| 2002 | 65 | 65 | Blanc *et al*, 2003 |
| 2004 | 148 | 200 | Yirmed Demeke *et al*., 2006 |
| 2005 | 164 | 200 | Yirmed Demeke *et al*., 2006 |
| 2006 | 187 | 250 | Blanc *et al*., 2008 |
| 2007 | 264 | 324 | Yirmed Demeke, 2008 |

*Count = an estimate made by counting Elephants, Speculative = is the difference between the upper and lower estimates.*

The data should be interpreted with caution as most of the results are based on opportunistic sightings and no systematic population survey has been conducted to know the total population size which only can be done by aerial surveys as most of the area is inaccessible for ground assessment. The Elephants counted in the recent years look encouraging may be due to the intensive survey conducted by the researcher or the former wide Elephant range in the eastern part has been taken by pastoralists who forced Elephants to concentrate in the Erer and Gobele Valleys. However, there is a need to do long-term research and monitoring on Elephants movement and population size to clearly talk about population trend and challenges facing BES.

### 4.4.4. Population demography

Three years monitoring of 193 video recorded Elephants in BES showed a female biased population sex ratio, with four times as many cows to bulls and large Elephant herds known to occur both during peak and late dry season and in late rainy season. However larger aggregations are known to occur during the wet season in the Erer Valley and

variability in herd size was high during the dry months and believed to be a reflection of the mobility of the herd in search of food and water (Yirmed Demeke, 2009). The age and sex structure and the population dynamics of Elephants in the sanctuary was determined using a combination of direct observations, footprints and droppings measurement of 264 Elephants in the early 2007 and 9 family units, and some bull groups were identified. Of these, bulls constitute 8.8% of the total population but the respective of 8.1%, 6.1%, and 8.0% were cows newborns and yearlings (from birth to 1 year old) which gives an average birth rate of 7.4 %.

### 4.4.5. Phylogenetic status of Elephant population

Phylogeny of African Elephants has brought serious implications and concerns for a multiple species scenario (AfESG, 2002). There has been widespread disagreement amongst taxonomists and experts as to whether the differences between the forest and savanna Elephant types were significant enough to denote separate species. Roca *et al*. (2001) identified the forest Elephant as a distinctive species; *L. cyclotis* based on 21 samples collected from populations across Africa to examine genetic diversity. Eggert *et al*. (2002) cited in Yirmed Demeke, 2009, *based on* mtDNA analysis of samples collected from 10 locations, indicted three deeply divergent lineages, namely the forest Elephants of central Africa, the forest and savanna Elephants of West Africa and the savanna Elephants of eastern, southern and central Africa. It was concluded that the Central African forest Elephants to be more similar to the Asian Elephant. The possible explanation given for this was that *Elephas* was dominant but went extinct in Africa *and* paved the way for *Loxodonta* to increase in numbers and expand its distribution to occupy former *Elephas* ranges (Eggert *et al*., 2002, cited in Yirmed Demeke, 2009).

Some studies proposed to divide African Elephant populations into subspecies because of the wide variation in their body size and morphology (Lydekker, 1907; Osborn, 1942). Likewise, Yalden *et al*. (1986) and Largen and Yalden (1987) adopted the subspecies classification recognized by Lydekker (1907) and Ansell (1971) for Ethiopian Elephants. Accordingly, based on some morphological characteristics and geographical delimitation, three subspecies, namely, *L. a. oxyotis* (Matschie, 1900 cited in Grubb *et al.,* 2000), *L. a.*

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*knochenhaueri* (*cavendishi* as a synonym, Matschie, 1900) also called the "Massai Elephant" and *L. a. orleansi* (Lydekker, 1907) also referred as the 'Somali-arid Elephant', were known (Yirmed Demeke and Negusu Aklilu, 2008). The latter race was a particularly distinctive subspecies but it became extinct from northern Somalia and adjacent eastern Ethiopia in 1928 (Hunt, 1951; Funaioli and Simonetta, 1966). However, the limits of each subspecies distribution proposed by Ansell (1971), the Omo and Wabi Shebele Rivers, could never act as effective barriers for Elephant movements or hinder them from interbreeding (Yirmed Demeke *et al.*, 2006).

Recent analyses of mtDNA and nuclear DNA for Babile Elephants showed that Elephant mtDNA matched those of Savanna Elephant clades: according to Yirmed Demeke (2009), Babile Elephants carry a haplotype that is also found across Southern and Eastern Africa, and is the most geographically widespread and most common haplotype of those identified using the *ND5* gene (Roca *et al.*, 2005). However, the samples taken were only from three Elephants and may not be enough for generalization.

## 4.5. Human-Wildlife Conflict at BES

### 4.5.1. Definition of the concept

The term "human-wildlife conflict" usually raises controversies and it is necessary to have a common understanding of its meaning and bearing before its analysis at BES. To have a better understanding it will be useful to understand "Who is really the trouble or problem animal, human or wildlife?" Of the various literal definitions of the word 'conflict': incompatibility and interference, as of events and activities, clearly articulate the concept of human-wildlife conflict. As of the case in the BES, human beings are undertaking incompatible activities in the wildlife ranges and wildlife are interfering with human activities, and as a result conflict arises. The situation here signifies that human population encroaches into the wildlife habitats and most of the human events are incompatible with the environment constraining wildlife ecosystems and behavior. These

incompatible activities of human beings are expressed in terms of conversion of natural habitats to agriculture and poaching of commercially valuable species (Blower, 1968; Bolton, 1973; Yalden *et al.*, 1986). Secondly, in the following paragraphs human-wildlife conflict (HWC) is going to be dealt as Human-Elephant Conflict (HEC) because almost most of the human-wildlife conflicts in BES are between human and Elephants.

### 4.5.2. History and causes

A thorough understanding and investigations of the history and causes of HEC is crucial before considering any management options and mitigation measures. Patterns of land ownership and land use systems are not simply a question of social matters, but they could bring profound side effects on political, economic and ecological stability. Shortage of land and unsustainable land uses are major causes for mass movements of people into new settlement areas, which often have serious adverse environmental consequences. People leave their homes and are forced to make a living on marginal land that should not be cultivated or is unfit for agriculture.

Human population growth is the underlying cause for human encroachment and expansions into wildlife areas. Therefore, human causes appear to be the prevailing factors responsible for the shrinkage of Elephant habitats. As a result of this, conflicts arise between Elephants and humans competing for scarce land and resources. Once the ecosystem is disrupted, conflicts could be initiated by both people and wild animals such as baboons, monkeys, warthogs, hyenas, Elephants, and birds. Conflicts are usually reflected by crop raiding and killing of livestock (Yirmed Demeke, 2009).

In the following paragraphs expansions of human settlements, agriculture and other events into the BES are presented in chronological order to critically look at the history and causes of HEC in the sanctuary (Stephenson, 1976; Yirmed Demeke, 2009).

**Events prior to the establishment of the sanctuary**

Historical evidence relates to small numbers of the main ethnic groups in the area, namely the Oromo and Hawiya tribes that led a semi-pastoral life with some subsistence farming. Seasonal movements of people and their livestock were present. Most of the livelihood activities concentrated on the northern edge of the sanctuary. It was evident that access to the rest of the sanctuary was limited not because there were restrictions but numbers of people and livestock were within the carrying capacity of the area. Evidence of small amount of competition between Elephants and people was seen at times for water and graze but at the same time crop damage by Elephants was all outside the present boundaries of the sanctuary.

**Event at the time of the establishment of the sanctuary (1970 - 1976)**

Evidence at the time of establishment of the sanctuary shows there were no permanent villages inside the sanctuary.  Increase in human population resulted in advancement of new farmlands in the northern sections of the sanctuary. By 1973, large-scale state farms were established south of the Harer-Jijiga road north of the sanctuary. In 1975 these state farms were taken over by local communities. These new developments coupled with growing human population and advancing habitat destruction formed the frontline for HEC at BES. Competition between Elephants and pastoralists was limited to access for forage in the valleys and it appears there was enough forage resource for all. As a result, competition did not spark of conflict in other sections of the sanctuary. The Ethiopian Wildlife Conservation Organization was called in at times to shoot problem animals at conflict zones in the northern section of the sanctuary where there was evidence of crop raiding (Stephenson, 1976).

**Events during the Ethiopian-Somali war (1977 – 1978)**

The events that followed the Ethio-Somali war brought a number of changes in human settlement and demography at BES. Evidence shows that more land was cultivated and

taken as a holding by immigrants who fled the consequences of the war. These settlers left their former land along the upper Erer and Fafum. In addition to the settlements that followed the war, pastoralists who formerly resided in the eastern part of the sanctuary gradually engaged in crop growing and doubled the cultivation in the Fufum Valley. These pastoralists had lost their livestock during the 1974/75 drought and took up agriculture as a back-up to their traditional pastoralist way of life. Settlements became more permanent with the expansion of agriculture and as a result, crop raids by Elephants become perennial. Consequently, both humans and Elephants suffered injury and death (Yirmed Demeke, 2009).

### The re-settlement program of the Dergue Regime (early 1980's)

During the nationwide resettlement and villagization campaigns, people from drought affected areas were resettled into the edge of the sanctuary and by 1985 additional new villages were established in the sanctuary (Yirmed Demeke, 2009)). This kind of development aggravated the conflict between Elephant and people. Since most of the Elephants' habitats in the northern portion of the sanctuary were taken over by people, Elephants were forced to migrate and were restricted to the southern sections.

### Events in recent periods

Human settlements and concurring habitat destruction have exacerbated the condition for the Elephants. There is more encroachment of people into remaining habitats of Elephants. Agricultural expansion, deforestation, fuel wood and charcoal production threaten the survival of the Elephant. The southerly agricultural expansion has engulfed some of the most important water supplies and feeding sites of the Elephants. Frequent attacks by Elephants on crops, human lives and livestock have become common. This in turn has placed great pressure on the farmer and difficulty in affording protection from Elephant raids. This situation might be further aggravated as the result of clearing of large tracts of land (12,000 ha) for bio-fuel production by Flora Eco-Power (Yirmed Demeke and Negusu Aklilu, 2008).

In general, upper Fafum and Dakata valleys in the north eastern part of the sanctuary were the most preferred Elephant habitats until the 1970s. However, when these areas became occupied by Somali agro-pastoralists in the 1970s and 80s, the Elephants were forced to concentrate in the west along the Erer and Gobele valleys and the adjacent areas. Currently, there is a continuous conflict between Elephants and the local farmers in the northern section of Erer and Gobele Valleys, where the majority of the Elephant populations are confined in the reverine forest of the valleys. The conflict becomes much worse when Elephants move outside the sanctuary seasonally between November and March. However, there has not been any compensation for the damages from the sanctuary's management or any kind of benefits for the community.

### 4.5.3. Extent and trend of HEC

Human demographic growth is the major driving factor for the increase in village and agricultural encroachments in many protected areas. In 1950, the human population of Sub-Saharan Africa (SSA) represented only 7.6% of the global population, but 11.3% in 2000, and it is expected to represent 15.3% in 2030 with more than 1.2 billion people (Chardonnet, 2002). Based on the information for SSA, the estimated population growth for Ethiopia in 2050 is expected to reach 120 million.

Human causes appear to be the prevailing factors responsible for the shrinkage of Elephant habitat. The most important long-term threat to the presence of Elephants in the sanctuary lies with human settlements and particularly agriculture and livestock rearing.

**Village and agricultural encroachments into the Elephant ranges**

People living inside and in the surrounding areas of the sanctuary appear to be the main cause for the reduction and modification of Elephant habitat through a number of factors such as expansion of villages and agricultural lands. Human encroachments in all directions of the sanctuary were observed. At present, 75 villages have been identified both within and adjacent to the sanctuary (Yirmed Demeke, 2009; WSD and EWCA,

2010). Of these, more than 41 villages were recorded inside the sanctuary, of which about 30% of it was established during the nationwide resettlement campaign carried out in 1985 (Helen, 1989). Twenty eight (28) of the villages which are mainly occupied by pastoralists are in the Babile-Somali District. The other villages; five in Fedis and eight in Midega Tola Districts are mostly agriculturalists (Yirmed Demeke, 2009). In the same study, Yirmed Demeke (2009) has estimated that more than one-fifth of the sanctuary area (1,395 km$^2$) was encroached by villages since 1976.

Yirmed Demeke (2009), in his study has recorded several illegal agricultural fields in the core areas of Elephants inside the sanctuary, mainly in the Erer and Gobele Valleys. These areas are considered to be a major HEC sites. From these two major HEC areas alone (Upper Erer and Gobele Valleys), 404.3 ha of farmlands were cultivated by 469 farmers. In the same study, it was reported that during the year 2004 an area of 23 ha of forest was cleared for agricultural land. However, there is a positive move by the sanctuary's management to free about 10,000 ha of land at Erer Valley following the re-demarcation of the sanctuary (Wondowosen Sissay, Pers. Comm.)

When we see the spatial distribution of villages inside and outside the sanctuary, it is not difficult to imagine the extent of HEC. Wildlife for Sustainable Development (WSD) and EWCA (2010) identified 46 villages that have a range of seasonal contacts with Elephants. Eight districts that have the most serious conflicts with wildlife were identified: Babile-Somali, Babile-Oromia, Fedis, Midega Tola, Haromaya, Kurfa Chele, Girawa and Meyu (Yirmed Demeke, 2009). Of these, at least 25 villages are located mostly in Babile-Oromia (27%) and Meyu Muluke (20%) Districts. These areas are in the forefront for human-Elephant and/or human-wildlife conflicts. Human and livestock encroachment within the habitats and migratory corridors of Elephants and other wild animals will continuously be a major source of human-wildlife conflicts.

### Problems caused by Elephants

The African Elephant requires vast areas in which to roam. This tends to bring Elephants into direct competition with people whose need for land is increasing exponentially.

Consequently, interactions between humans and Elephants are increasing and intensifying accordingly. It is therefore, on the perimeter of these that most conflicts occur (Chardonnet, 2002). The interface between Elephant and people conflicts most often consists of crop raiding, destruction of houses, and killing and injuring of human beings and livestock. The spatial patterns of crop raiding by Elephants have been reported to have changed radically over the last three decades (Yirmed Demeke, 2009). During and before the establishment of the sanctuary (in 1960s and 1970s), most crop raiding problems were reported outside the sanctuary at three fronts: northeast, east and southwest. However, in recent times more than 90% of complaints about Elephants were reported from inside the sanctuary (Yirmed Demeke, 2009). During the last 3 to 4 years alone 32 villages were subjected to Elephant attacks in the form of crop raiding, destroying wells and houses, injuring/killing of livestock and people.

Recent development in terms of the spatial pattern of crop raiding has indicated that Elephants used to move to the villages adjacent to the sanctuary rather than inside. To verify this, Yirmed Demeke (2009) has reported 354 Elephant incidents, of which 51% were outside the sanctuary and 49% inside. Crop raiding at the sanctuary was reported mainly on maize and sorghum fields.

### Elephant attacks on people and livestock

Seven years data (2000-2007) on Elephant attacks on livestock were reported mostly on cattle (43.6%) followed by camel (37.5%) and the attacks of Elephants on goats, sheep and donkeys were insignificant (Yirmed Demeke, 2009). Furthermore, 14 incidents of Elephant attack on humans of which 12 deaths and two injuries were reported by Yirmed Demeke (2009). Most of the human deaths and injuries (57%) were recorded in the western part of the sanctuary, adjacent to the villages of the Gobele Valley, and the remaining 43% of the incidents took place in Erer Valley and adjacent areas (Yirmed Demeke, 2009).

**Killing of Elephants by people**

Since Elephants are causing various damages, they are considered by local people as dangerous animals that should be eliminated. Persecution of Elephants by people is further exacerbated when local measures to prevent HEC and to compensate the losses in livestock or human lives are absent. Thus, the sporadic shooting of Elephants after crop-raiding conflicts has become a major threat to Elephant population at BES (Yirmed Demeke, 2009). The HEC was widespread in BES since the 1960s and 70s; however, the incidents have not been well documented except by Stephenson in 1976 and recently by Yirmed Demeke in 2009. In 1974 for instance, nine bulls were selectively killed by the local communities after frequent raids of Elephants on crops of private and government owned farms (Stephenson, 1976). Such conflicts have continued for the past four decades as more wildlife habitats of the sanctuary encroached by farming communities. Yirmed Demeke (2009) also documented that five Elephants were killed by people between the years 2003 and 2007 in relation to crop raiding. In 2009 and until September 2010 three and six Elephants were killed by poachers, respectively (Wondowosen Sissay, Pers. Comm.).

In general, a common consequence of human occupation of Elephant habitat is the development of negative perceptions in the mind of local communities. However, results of assessments of people's perception towards Elephants (Yirmed Demeke, 2009) indicates that majority of the respondents (71.2%) had a positive attitude, supporting the survival of Elephants in the sanctuary.

If wildlife habitats are converted to agriculture or grazing for domestic livestock, human/Elephant conflicts are bound to increase. Unless conflicts are alleviated, locals will shoot and poison wildlife, leading to fewer or local extinctions of the African Elephant populations from the sanctuary. The future of wildlife, in particular the survival of the Elephant both outside and inside BES depends on the views and aspirations of the local people and sound law enforcement measures. Only when the local inhabitants have a particular interest in conserving Elephants and other wildlife will their future be ensured**.**

# 5 Values and Significance of BES

## 5.1. Values

➢ **Babile Elephant Sanctuary provides refuge to the threatened population of Elephants**

Babile Elephant Sanctuary is one of the most important sites that support a critically endangered Elephant population in the country. It harbors an isolated population of Elephants within its borders. This Elephant population is the only extant assemblage in Eastern Ethiopia and certainly in this section of the Horn of Africa. Elephants in this region are known to have been isolated from others in the region for more than 8 decades. The establishment of the BES did not help the conservation of the Elephants it was meant to conserve. In fact since 1970, which was the year of its establishment, it has undergone a number of negative changes all adding up to the present shrinkage of Elephant range in the region.

➢ **Provides a critical dry season watering area for both wildlife and livestock population**

The Gobele and Erer Valleys provide the best and only dry season watering points for wildlife and livestock in the area. Water is by far the strongest limiting factor determining movements, distribution and life of its inhabitants. The Jijiga Zone in Somali Region and the Eastern Harerghe Zone in Oromia Region are one of the most water scarce patches in the country. Droughts are persistent and the climate is hot, dry and harsh. Despite this condition, rivers and water holes are present providing life giving water for nature and people.

➢ **It supports other endangered, threatened and endemic species**

Besides Elephants, BES is home to the Black-manned Lion and a number of other important species. Babile Elephant Sanctuary is known to be home to at least 191 species

of birds and 30 larger mammalian species. It is a location for biome-restricted assemblage and rare species. The endemic and rare Salvadori's Serin (*Serinus salvadorii*) is found within the sanctuary. Together with this, the sanctuary is an excellent representative of the Somali-Masai Biome within the Horn of Africa.

> ➢ **It forms one of the most important hydrological regimes in a wider range of the landscape**

Rivers that originate in the highlands above BES flow in a south-southeasterly direction towards the Wabi Shebelle River. Wabi Shebelle which is one of 12 important river basins in the country is located about 100 km south of BES. The upper reaches of the sanctuary including the highlands of Gara Mulleta and Harer-Gursum act as water catchment for significant tributaries of the Wabi Shebelle. Some of the important rivers that have their sources in the highlands are Mojo, Ramis, Gobele, Erer, Dakata and Fafum. Without this network of river systems this extensive area that is mainly arid and semi-arid would largely be a parched expanse of land.

> ➢ **BES presents an untapped potential for ecotourism**

Protected area in general can form the basis for carrying out ecotourism and other nature-based tourism. Ecotourism today is the most rapidly growing sector in the tourism industry worldwide. In various studies conducted worldwide (Ceballos-Lascuráin, 1996), it is rare to see a national tourism brochure that does not include photographs or other references to protected areas. This fact persist despite the fact that environmental management with regards to tourism development is either totally absent or very little is being done about it in various countries.

Babile Elephant Sanctuary has the untapped potential of providing valuable ecotourism that can benefit the nation, surrounding communities, and enhance the visitor's experience. While there is a wide promotion of BES's Elephants and nature, this promotional activity should be used to derive both financial and social benefits from

ecotourism in the area. The sanctuary faces several threats to its existence and the most pervasive is the threat from growing human activities in and around it. If conservation action cannot succeed in securing the support of local inhabitants, the effort, time and finances spent here will largely go wasted. While there are several issues that need to be considered when beginning an ecotourism activity, one of the most important requirements is that it should actively involve local communities so that they benefit from its activities. This important aspect will assist to galvanize local support for the continued survival of the protected area.

Babile Elephant Sanctuary has a huge potential to be one of the tourist destinations sites in the eastern part of the country as it has both ground and air access and incredible tourist attraction sites including the relic elephant population and other wildlife species, Dakata marvelous Rock Valley, the ancient Harer Town, Prison House of Lij Eyasu at Gara Mulleta Highlands, hyenas in Harer, the culture and tradition of the community so long as properly managed and well advertised.

## 5.2. Significance of BES

The BES has conservation significance for many reasons. In the first instance BES presents a conservation concern since it has lost and is still losing its Elephants and other wildlife resources. The protection of the few remaining wildlife population has become increasingly difficult as the rural human population continues to double every 25 years. The area is extremely important for Black-manned Lion (*Panthera leo*), Cheetah (*Acinonyx jubatus),* Leopard *(Panthera pardus),* and African Elephant *(Loxodonta africana)*. The site also affords protection to several antelope species, notably Lesser Kudu and Greater Kudu. Generally, BES protects a representative ecosystem within the Somali-Masai Biome and still has pockets of relatively intact ecosystem. The area is known for its riverine vegetation, Acacia scrub/bushland and open plains. Moreover, the spiritual and educational value of such a place is incalculable as its wilderness and resources potential could contribute its part towards the economic development of the

country. The local people can also benefit from these resources as it can be a means of generating and improving its livelihood. Besides its ecological values, the area provides diverse economic benefit from tourism in the years to come since it is situated close to the tourist destination areas in eastern Ethiopia.

In spite of being an outstanding part of the country in terms of its floristic and faunal composition, sound surveillance is inadequate and it lacks a management plan. With the exception of some sites at Gobele and Erer, the sanctuary has not received effective protected area management directives in the past. Recovery of the ecosystems at BES is a possibility but requires a coordinated effort. However, human Elephant conflict, investment, repeated droughts, grazing pressure and other adverse human activities have aggravated the resource depletion in the sanctuary. It is, therefore, time to develop this Management Plan for sound conservation and development activities.

# 6  Opportunities, Constraints and Threats

## 6.1.  Opportunities

**Unique fauna**

Babile Elephant Sanctuary harbors a relic Elephant population within its borders. The site is also the easternmost section of the continent with a viable population of Elephants. Thus Babile contains the only surviving Elephant population in the Horn of Africa. This population is known to have been isolated from similar populations for over eight decades and faces pronounced threat of extinction.

**Babile Elephant Sanctuary boasts large area coverage**

Babile Elephant Sanctuary is one of the three wildlife sanctuaries in Ethiopia with the largest area coverage. It constitutes 30% of the total area held by the principal wildlife protected areas in Ethiopia and is estimated to cover 6, 982 km$^2$. The other large protected areas are Gambella and Omo NPs with an area of 5,061 km$^2$ and 4,068 km$^2$, respectively. Effective size is an important factor in protected area management systems if it can be corroborated by strong management. Size of an area can influence viability of rare species and allows for safe dispersion and colonization of an area by a population. Size of a protected area can be a reason for the number of species, diversity of communities and ecosystems in an area. Babile Elephant Sanctuary by convention was not established with prior planning. Its boundaries were set arbitrarily on the orders of the late Emperor Haile Selassie I. But still, the area encompassed by this unique area is large and constitutes characteristic habitat forms not found elsewhere in the country.

**Proximity to towns and cities**

Babile Elephant Sanctuary is found between two large towns of Harer and Jijiga. The towns of Babile, Boko, Lencha and Dendema are near the sanctuary providing centers for

woredas administrative and other offices. Proximity to towns has its own negative implications but also with a positive side. Towns have a growing population which if supportive of a conservation area can bring benefits and income to the development of the conservation area. The proximity of the sanctuary to major towns and settlements can also provide a natural laboratory where countless scientists and students gain insight and knowledge on the workings of nature and ecosystems.

**Proximity to other tourist attractions in the region**

Babile Elephant Sanctuary is close to a number of tourist attractions and a visitor will have the benefit of appreciating other historical, cultural and natural assets in the locality. Harer town, with its ancient history, its famous walls and hyenas form exceptional tourist attractions drawing thousands of visitors every year. The unique ethnicity of the Harari, Oromo and Somali people forms an exceptional mix of cultures imparting to this town a colorful and vibrant nature. The presence of the interesting geologic rock formations at Dakata's Rock Valley and the Prison House of Lij Eyasu in the Gara Mulleta Mountains are other important tourism attractions.

**Presence of on-going and dedicated research**

Babile Elephant Sanctuary has received attention regarding its Elephants with notable and dedicated research by Dr. Yirmed Demeke. This on-going research has been a route not only for specialized knowledge on the relic population of Elephants in the area but also has produced significant awareness and knowledge base about the area in general. Ongoing research has mainly concentrated on conservation, ecological and evolutionary aspects of the Elephants of the area. This research has also covered critical aspects of Human-Elephant Conflict and threats to the existence of wildlife with particular emphasis on the Elephant population. Preliminary research on attitudes of local inhabitant on the presence of BES and on-going conservation has also offered an exposition of people's behavior towards Elephant conservation.

**Possibilities for research are wide and varied**

Babile Elephant Sanctuary is one of several Ethiopian protected areas with the potential of intensive and ongoing research on several aspects. Investigative measures are required to resolve a number of issues regarding the status of different wild fauna and flora and determine socio-economic parameters. Surveys and monitoring activities are possibilities which can be extended to various sections of the sanctuary. Applied research that focuses on finding solutions to HEC and increasing threats to conservation in the area should be given priority.

**Support from local administrative bodies**

Babile Elephant Sanctuary receives various levels of support from local administrative bodies. Regional, Zonal and Woreda level support is important for its existence and this has been demonstrated in a number of ways at different times.

**Growing support from local inhabitants/ Goodwill of local people**

Babile Elephant Sanctuary has been a symbol of controversy for a number of years as the result of conflicts between people and its Elephant population. While there are no clear signs that this conflict has abated or lessened in present time, there is increased awareness about the issue amongst local inhabitants. This increased awareness is believed to be the basis for tolerance and will pave the way to finding solutions to minimize or even neutralize conflicts in the future. This goodwill by communities has been demonstrated and will go a long way to finding lasting solutions to the prevailing difficulties the sanctuary faces.

## 6.2. Constraints

**General**

Traditionally, the indigenous people of Ethiopia had lived in harmony with wild animals, using them as source of meat and exercising their hunting prowess without momentous

threat to any species. However, with the increase in human and livestock population the threat to wildlife has became terrifyingly high. Massive areas of forest cover were cut down to make way for agriculture and gradually the wildlife of Ethiopia has found itself pushed back into inaccessible areas that are not yet made available for development.

The overall objectives of wildlife conservation in Ethiopia are to increase awareness of the general public for the country's natural and national heritage, and to ensure the continuity of all wildlife species, mainly those in wildlife conservation areas, but also within the entire terrestrial and aquatic ecosystem of the nation. However, the following points could be accounted as major challenges for attaining these objectives.

**Policy and legal issues**

In general, there are some unclear land use policies and incomprehensible legislation for sound ecosystem conservation in Ethiopia. Lack of clear and incompatible polices relate to improper land use planning. Some of the present laws are biased and sometime conflicting in nature. They do not specify activities for land use systems and there are conflicting sectoral interests as a result of non-integrated conservation and development objectives. It is not different for BES. People carry out unlawful activities within the sanctuary. According to the new Wildlife Conservation, Development and Utilization Regulation (2009), no person is allowed to carry out or attempt to carry out any of the following acts in NPs and wildlife sanctuaries:

> *convey or possess any weapon; take, disturb, destroy, damage, or deface any natural or man-made object or structure; cultivate or prepare land for cultivation; graze any domestic animal; drive, convey introduce or permit to stray any wild or domestic animal; fell or cut trees, remove, damage, convey or introduce any plant; collect honey, keep honeybee or other forest product;*

Furthermore, BES lacks the legal rights with regards to gazettment and thus its boundaries recognition by local communities and local government. This might have resulted in extensive illegal encroachment for livestock grazing, settlement and investment. The eastern part of the sanctuary is politically insecure and boundaries on the

Somali side have not been demarcated as a result of inaccessibility and security reasons. The Somali occupy what they regard as their traditional territory in the eastern and southern part, which covers over 70% of the sanctuary, whereas the Oromo speakers claim the western portion of the sanctuary along the Gobele and Erer valleys, which is seasonally used for grazing and watering points for local residents.

**Weak legislation and law enforcement**

Generally, there is no enough capacity for enforcing law at all levels to help combat poaching and illegal trade in ivory and wildlife products. The wildlife law and the mechanisms for law enforcement for conserving and managing the African Elephants in Ethiopia are poor. Even at an international level, laws and byelaws for the conservation and management of the African Elephant are inappropriate and are ineffective when taken to range countries with Elephants. Staff at BES does not have appropriate tools to carry out their mission as safely and effectively as possible. This includes lack of legal authority and equipments (firearms, ammunition, GPS etc). Key stakeholders both at national and regional levels (neighboring countries) are not in one accord and there is little exchange of information and experience. As a result, it is quite easy to smuggle ivory and other wildlife products from one country to another. Weak legislation and law enforcement also goes to the patterns of settlement and resource use within the sanctuary at present. Wildlife poaching, settlement and other adverse human activities continue within protected areas undeterred since penalties are inadequate or missing altogether. Most of the sanctuary is not accessible and unsecured to construct outposts.

**Management issues**

The management of BES is in need of better capacity, knowledge and ability to cope with the demand from growing human and livestock population inside its boundaries. BES is losing its habitat by livestock, agriculture, investment, settlement and other adverse human activities. There is insufficient awareness at all levels of government and general public on the significance, needs and potential of the wildlife resources. Inadequate

knowledge of the resource quality, quantity, and distribution and habitat requirements within BES also limits predictions and the planning of future strategies. High HEC along the Erer and Gobele valleys is a continual problem that has not been solved up to today.

**Institutional framework**

The EWCA's new structure does not well address community conservation participation issues. There appears to be a unified gender affairs section at federal level but is not well-represented at site level. This is most crucial for sound collaboration with communities in the area of wildlife management. There is in general lack of community-based resource management or participatory management, community outreach approach for sustainable use and conservation of the wildlife resource. Lack/weak of coordination between federal and regional concerned organizations and stakeholders, is also an impediment to future collaborative work. Its management is not backed by modern and relevant technology for efficient and effective wildlife conservation.

**Low capacity of human resources**

Compared to the sheer size of the sanctuary the management staff is too little. The sanctuary has only 27 scouts with a ratio of one scout to about 25,500 hectare of area. Beyond this fact, wildlife personnel are frustrated as a result of poor living conditions, lack of insurance (risky living conditions), incentives including poor remuneration, and lack of facilities.

**Increased poaching and habitat destruction**

One experiences that farmland is expanding at the expense of ecosystems both internally and externally. Internally from growing human population that needs to clear more land for food production and settlement. Externally as a result of land being leased to investors for various development activities. Arable agriculture is a major problem but

uncontrolled grazing is also causing havoc with the ecosystem. Together with this poaching is widespread and clearly difficult to control or follow-up.

**Infrastructure and equipment**

Generally, BES has rather poor management infrastructure as compared to other protected areas. It does not have a headquarters inside the sanctuary and the current office is located in Babile Town. At present, there are at least three outposts complete and under construction, namely at Erer, Fedis and Meyu Muluke. The BES does not have its own management roads except an 18 km road to Erer valley. There are government constructed public roads that connect districts within and around its perimeter. Access to potential scenic and tourist attraction sites are not present. All settlements and farmer associations are accessible during the dry season. Equipment wise, it lacks adequate patrolling and camping equipment. Its communication system is not well established and needs wireless connection (radios) both in the field and at the headquarters.

## 6.3. Threats

**General**

In Africa, Elephant populations have declined at an alarming rate since the mid 1970s (USFWS, 2004). They were listed as "Threatened" under the U.S. Endangered Species Act of 1973. According to USFWS (2004), the major factors which have led to the decline of the African Elephant are poaching, HEC and changes in land-use. Globally, Elephants are listed as "Vulnerable" on the 2010 IUCN Red List of Threatened Species as the populations in some countries are growing (Blanc, 2008). Currently, the conservation and management of Elephants in Africa is facing a huge threat from the increasing human populations, habitat loss and fragmentation and the resultant human-Elephant conflict, and poaching (Dublin, 2007). According to Yirmed Demeke *et al.* (2006), the Elephant populations of Ethiopia are regarded as "Critically Endangered" as 90% of their population has been lost since the 1980s. The major causes for the decline of

the Elephant of BES include habitat contraction (due to settlement, agricultural expansion, and unsustainable land-use practices), poaching for ivory over several centuries, human population growth, and the continuous civil unrest over the past five decades (Yirmed Demeke, 2009).

These threats are not only specific to the Elephants and their habitats; rather they can have serious impacts to the whole biodiversity of the area. Though it is necessary to mitigate these threats in order to achieve effective conservation of Elephants and the other biodiversity of the area, it might be impossible to address all of them. Thus, the sanctuary management needs to prioritize these threats and the actions to be taken. According to Biodiversity Conservation Guide (2005), threats can be prioritized according to several factors: urgency of addressing the threat, probability of success in mitigating the threat, areas or species affected by the threat, feasibility of addressing the threat in terms of culture, politics and economy and the level of agreement among stakeholders about the threat.

Effective conservation and management interventions require an understanding of the context and the root causes of the threats. As management actions and activities are implemented, monitoring of these threats and identifications of others over time is an important adaptive management process that can give valuable information to maximize impacts and achievements of the management actions. Thus, as mentioned above, the main threats to the Elephants and to the whole biodiversity at BES are the following.

**Poaching/Illegal hunting and trade**

The illegal killing and/or the large illegal trade in ivory has been the main cause for the decline of the population of Elephants in Africa (Barnes, 1999). The hunt for ivory was further stimulated by the influx of a very large number of fire arms into East Africa during the mid- 19th century. Illegal poaching has occurred mostly during the 1970s and 80s when there was a high demand of ivory on the world market. Poaching was largely responsible for reducing the Elephants to their current level (WWF, 2009). For example,

the population of Elephants in Ethiopia and Kenya has declined by 90% and 85%, respectively during those periods (African Elephant Conservation Trust, 2002; Yirmed and Nigussu, 2008). As a result of this illegal killing of Elephants, the CITES Ivory Control System, which is the ivory quota and marking system to cut back illegal trade in African Elephant ivory, was established in 1989 to restrict the illegal trade in African Elephant ivory, and to encourage African countries to manage, conserve, and protect their Elephant populations (USFWS, 2004). The African Elephant was then placed on Appendix I of the CITES since 1990, which prohibits trading of any Elephant products internationally among parties to the convention.

Poaching still remains to be the biggest threat to the existence of Elephants in Africa despite the international ban of ivory trade since 1989 (Cantoria, 2009). Even though ivory trade is illegal except under specific circumstances which is controlled by CITES, there are still some domestic ivory markets in some of the Range States. Smuggled tusks are still being seized in some international ports and souvenirs made of ivory are being confiscated. In 2002, Ethiopia was identified by CITES as a country having the largest unregulated ivory market in Eastern Africa (Milliken *et al*., 2002). However, the country is making a significant effort to control its domestic ivory market. Recently in November 2009, 191 kilos of ivory, originating from Kenya, Sudan and within the country itself (Ethiopia), was seized from souvenir shops in Addis Ababa following the findings of TRAFFIC (Martin and Vigne, 2010). According to Martin and Vigne (2010), similar actions were simultaneously undertaken by authorities in Burundi, Kenya, Rwanda, Tanzania and Uganda.

In Ethiopia, the decline of Elephant population is mainly due to poaching for their ivory, coupled with loss of habitat (due to the increase in human population which in turn increased the demand for land) (Yalden *et al*., 1986; Largen and Yalden, 1987). According to Yirmed Demeke and Negusu Aklilu (2008), Elephants are viewed nationally as critically endangered species since the population has declined by 90% since 1980s. The current estimate indicates that the total Elephant population in the country ranges from about 1,200 to 1,550 (Yirmed Demeke *et al.*, 2006; Blanc *et al*.,

2007). Of this, a survey conducted in 2007 indicated that the population of Elephants at BES is about 324 individuals (Yirmed Demeke, 2009), which constitutes 21 to 27% of the total population of the country.

Poaching of Elephants for ivory still continues in the south (Mago NP), southwest (Gambella NP) and the eastern part (BES) of the country. Specially, the outbreak of the Ogaden war in 1977 and the subsequent proliferation of automatic weapons in the hands of local people might have resulted in an increase in poaching of Elephants. Poaching of Elephants and other wild animals might have intensified at BES like the challenges faced by other protected areas of the country during the government changeover in 1991. According to Martin and Vigne (2010), one Elephant was killed in July 2009 in BES, as reported by official of EWCA. According to the information obtained from the management of the sanctuary, Leopard is also selectively poached in BES (Wondwoson Sissay, Pers. Comm.).

It is known that the three principal anti-poaching operations used to combat poaching include mobile patrols, check points and the development of intelligence information (Hart and Smith, 2001). However, conservation of these endangered species has increasingly become difficult over the years as the result of sanctuary's budget constraints, few law enforcement officers, and existing security problems (political instability) in some parts of the sanctuary (Yirmed Demeke, 2009; Yirmed Demeke and Negusu Aklilu, 2008).

Stephenson (1976) observed a high proportion of young and small Elephants during the aerial survey in 1975, which might indicate the hunting of more mature males and females with big tusks. In 2007 survey, it was also found a highly skewed sex ratio of cows to bulls which might be caused by selective poaching of males, as mature males carry larger tusks (Yirmed Demeke, 2009). Illegal poaching does not only reduce the long-lived population of Elephants; it also leaves the legacy of consequences that future generations will have to deal with. Selective killing of older Elephants for their big ivory disturbs the population and demographic structure of the remaining groups by changing

the behaviors of Elephants and decreasing the number of old, adult female kin (Gobush *et al*., 2007)). Killing of older females and males reduces the matriarchal based repository of information and experience and shifts the dominance hierarchy and increases aggression (Mackey *et al*., 2007).

Finally, the issue of Elephant poaching is not only a national issue; rather it is regional and international. In addition to enforcing the national anti-poaching law and controlling the domestic markets, the issue needs effective collaboration and regional agreements among range states to control and punish cross-border Elephant poachers. This collaboration should also be extended to the ivory consumer countries since Elephant poaching has not stopped despite the 1989 international ban on ivory trading (Clover, 1995). For example, the United States is committed to assist the African countries in the conservation and protection of the African Elephant by supporting and providing financial resources for conservation programs such as research, conservation, management, or protection of African Elephant projects under African Elephant Conservation Act (USFWS, 2004).

**Habitat degradation/Habitat loss and fragmentation**

Over the centuries, the historical range of Elephants in Africa has shrunk and fragmented and the populations of the Elephants became scattered (Barnes *et al*., 1990). The continental decline of the African Elephant population and the contraction of its range are attributed to the human population expansion and desertification which lead to habitat loss (Cumming *et al*., 1990). It is predicted that habitat loss and degradation will continue to threaten the survival of Elephants as human population continue to grow in the Elephants range (WWF, 2009). In Ethiopia, human population pressure and the associated disturbances are the major problems for ineffectiveness of protected areas management (Shibru Tedla, 1995). The Elephant population and their range are decreasing as the result of habitat destruction due to human expansion and unsustainable land-use practices (Largen and Yalden, 1987; Barnes *et al*., 1999).

During the 1970, when BES was proposed, the degree of human interference was minimal, except crop cultivation and charcoal making along the Babile-Jijiga road (Stephenson, 1976). Human settlement was also minimal except the Somali pastoralists who use it for livestock grazing seasonally. Until 1973, there was no any cultivation south of the main road between Babile and Fafum towns; however, north of Harer-Jijiga road was completely used for farming (Stephenson, 1976).

Since establishment, the sanctuary has not got the attention from the government and wildlife authorities in terms of limiting human activities in the sanctuary. State owned large scale farms such as Haromaya University, Biada police, and Erer-Wabi Shebelle Haile Selassie Foundation farms were established by government bodies in Dakata, Fafum Valleys, and between Erer-Guda and Erer-Tika, respectively, just within three years after the sanctuary was proposed. Due to this, native trees were cleared and grassland areas which are important for wild animals were converted to cultivation, and more importantly, enclosed dry-season wildlife watering sites (Stephenson, 1976).

Due to civil war and continued tribal conflicts since 1970s in the region, BES has also been suffering from a huge influx of settlers and their livestock for the last four decades. During this long period, conservation efforts in BES were hampered by establishment of settlements, agricultural expansion, deforestation and livestock grazing were intensified. As a result of this mass migration, the size of the sanctuary has shrunk and its habitat quality to support wild animals has deteriorated (Yirmed Demeke *et al*., 2006). Ultimately, this resulted in reduction of suitable habitats and home range of Elephants. Conversion of natural habitats to agriculture/cropland, settlements, or other human-influences ecosystems is a huge threat to the whole biodiversity.

It was reported by Stephenson (1976) that there was bad land utilization practices which has eroded steep-slope cultivated areas and eventually became unusable at the time. Such practices and migration of farmers from other areas are the main causes of land shortage around BES. This has led to clearing and/or burning of virgin forests and other cultivable areas which provide forage and protection for the Elephants and other wild animals in the

sanctuary. This has resulted in the declining of the home range of Elephants by 65% (Yirmed Demeke *et al.,* 2006). Ultimately, the effective size and quality of the sanctuary is declining as a result of the mass influx of farmers and their livestock. Currently, there are about 40 villages established within the boundary and another 35 villages adjacent to the sanctuary (WSD and EWCA, 2010). As a result, about 1,507 km$^2$ of land, which was part of the original area of the sanctuary is used as settlement and cultivation during the past four decades: 768 km$^2$ in Fedis and Midega Tola Districts and 739 km$^2$ in Babile-Somali Districts. In addition, 786 km$^2$ area of the sanctuary is occupied by agro-pastoralists in Somali Regional State. With the current human population growth rate (2.3%, CSA, 2006), the need for more land for cultivation and settlements is still rising which could be a continuous threats to the limited remaining habitat of Elephants and other wild animals.

In association with the huge human settlement in and around the sanctuary, non-farm extractive activities such as firewood supply and charcoal production are placing increasing pressure on wildlife habitats. According to W/ro Genet Meshesha, Vice Bureau Head of Women Affairs of Fedis District, more than 1,000 quintal of charcoal passed through the Fedis District every single day from different places in the surrounding. In addition to this illegal use of forest resources, the Women Affairs Bureau of the District had organized women with low income as rural cooperatives by providing loans to make charcoal and fire wood to generate income. Charcoal production served as a cash crop for a number of women. The staff of BES has intervened by creating awareness to the bureau to lessen the use of native trees for charcoal and fuel wood. The bureau has now stopped this activity; rather, the cooperatives are currently involved in preparing improved charcoal stoves, merchandise of goods, and other non-destructive activities. However, according to the information obtained from Fedis District authorities, the problem of charcoal production and fire wood collection for selling is still serious around Gobele, Erer and Garamuleta.

On top of this, rural households utilize the greatest proportion of energy which is originated almost totally from firewood, charcoal and crop residues (Ephrem Hassen,

2008). A significant majority of households (84%) noted that charcoal production at the BES is for sale, while the remaining is attributed for household use (Zelealem Wodu, 2007). The common plant species used for charcoal production are *Acacia tortilis, A. mellifera, A. Senegal* and *Balanites glabra.* The increasing demand of charcoal and fuel wood is destroying the woodland habitats in all the valleys.

**Human-wildlife conflict**

Human-Elephant conflict is one of the most serious threats to Elephants in Asia and Africa (Barnes *et al.*, 1999; Hedges and Gunaryadi, 2007). Human population growth is the main cause for the exacerbation of HEC and a major issue in Elephant conservation (Barnes, 1996). It is a complex and persistent problem threatening the long-term survival of African Elephants occurring where humans and people co-exist (Sitati, 2007). The conflict can result in killing of Elephants and significant economic losses for farmers. It is obvious in other reports (Augeri, 2007; Munshi-South *et al*., 2007; Cushman *et al*., 2007) that the movements of Elephants are affected by land-use and infrastructure developments such as cultivation, roads, settlements, and others. These practices create habitat loss and/or fragmentation, reduce Elephants range, and can result in increasing human-Elephant conflicts where both compete for space and resources.

As Elephant habitat is increasingly encroached by human settlements and agriculture, it ultimately causes high level of human-Elephant conflict. The rapid growth of human populations and expansion of agriculture into rangelands and forests create permanent loss of Elephant habitats. As their habitat contracts and human encroachment expands, people and Elephants increasingly come into contact in areas where farms border Elephant habitats. These farms further encroach upon wildlife habitats and fence off Elephant migration corridors. This has resulted in damage of crops and/or villages, loss of life (both human and Elephants), and continues to be a source of human-Elephant conflict.

There are five major causes to human-wildlife conflicts in BES: habitat destruction due to agricultural encroachment, hunting, crop damage by Elephants, threats to the life of

people and livestock by wild animals, illegal collection of forest products and livestock grazing (Yirmed Demeke, 2009). However, the HEC mainly manifests itself as land-use changes due to agricultural expansion (Zelealem Wodu, 2007). Local communities around BES are highly dependent on cultivation of crops and use of the natural vegetation for fuel wood, construction and fencing purposes. The increasing demand for more land for agriculture resulting in expansion of agriculture and settlements is reducing the home range of Elephants and other wildlife habitats of the sanctuary (Zelealem Wodu, 2007). Please refer section 4.5 for details about HEC at BES.

A study in one of the protected areas of Thailand showed that land use changes such as changing to crop types unpalatable to Elephants or switching to activities such as raising cattle would appear to make better economic sense than trying to protect vulnerable crop types by Elephants (Pattanakaew *et al*., 2007). Crop such as Chili (Capsicum) may have values as Elephant-resistant cash crops to deter Elephants from the surrounding farms (Hedges and Gunaryadi, 2007). However, the major problem to adopt alternative land-uses changes which could provide a permanent solution to HEC to benefit both people and Elephants is the high start-up costs (Pattanakaew *et al*., 2007). Another study in Asia (Kumar, 2007) indicated that understanding the ecological and behavioral responses of Elephants to habitat fragmentation is required for human-Elephant conflict mitigation and coexistence. Thus, Kumar (2007) suggested that strategies that combine land-use planning, which considers the affected communities and sharing benefits which exceeds the damage from Elephant conservation is necessary to manage the human-Elephant conflict.

**Invasive species**

In developing countries like Ethiopia, where agriculture accounts for higher proportion of GDP, the negative impacts of invasive species on food security and on economic performance of the country can be great (Anonymous, 2010). In Ethiopia, several exotic species are spreading at an alarming rate, threatening agricultural areas, rangelands, protected areas, water bodies, etc. The major species which are nationally declared as

noxious alien species include parthenium weed (*P. hysterophorus*), mesquite (*P. juliflora*), water hyacinth (*Eichhornia crassipes*), and *L. camara.* The weed species such as *P. hystrophorus* and *P. juliflora* have recently become a major threat to cereal production and agro-biodiversity, respectively (Ferdu Azerefegne and Tsedeke Abate, 2007). These invasive species are both economically and ecologically damaging, affecting agricultural, grazing lands and other important wildlife habitats. Introduction of non-native invasive species are the main threats to biodiversity (USAID, 2005).

At BES and the surrounding areas, *P. hystrophorus* and *L. camara* are widely distributed in agricultural areas, along road sides, settlements and in natural habitats. *Prosopis juliflora* seems to have been introduced to BES recently. It is distributed sparsely as observed in accessible areas. It is important to note that this is the best time to eradicate this aggressive woody species before it forms impenetrable thickets. Encroachment of *P. juliflora* can cause loss of biodiversity, reduction in forage production and become difficult to control its spread or eradicate from communally used grazing areas (Almaz Tadesse, 2009). Unlike *P. juliflora, Acacia mellifera* and *Opuntia ficus-indica* are the most abundant and widely distributed species in BES (Zelealem Wodu, 2007). Intact stands of *Opuntia ficus-indica* grow on both Erer and Dakata Valleys from the river banks up to the hills of both sides of the rivers. Abundant stands of this invasive species are growing with the riverine *Acacia* woodland extending for about 12 km on both sides of Erer Valley. Unlike the other invasive species, the fruits of *Opuntia ficus-indica* are liked by elephants. According to Yirmed Demeke (2009), two groups of elephants spent from June to September in the dense *Acacia*-cactus mixed woodland.

*Parthenium hystrophorus* was introduced accidentally through food aid shipments and is spreading rapidly in rangeland areas of Afar, Somali, Oromia, Tigray, Amhara, and Southern Nations, Nationalities and Peoples Region. According to reports, it is invading aggressively in agro-pastoral and pastoral areas and causing reduction in forage production and a noticeable decline of plant biodiversity available in the rangelands (Anonymous, 2010; Mckee, 2007). Both *P. juliflora* and *P. hysterophorus* tend to replace indigenous plant species (Mckee, 2007). On the contrary, *L. camara* was introduced

deliberately as an ornamental plant into different urban areas of Ethiopia, and it has spread out quickly in Oromia and Somali Regional States by birds and other animals that eat its fruits. It forms impenetrable thickets in grasslands, abandoned cultivation and waste areas in many localities especially in Eastern Harerghe and neighboring localities of Somali Region. Similar to *P. juliflora, L. camara* can quickly spread and its dense growth suppresses grasses and other useful forages in grazing lands. Zelealem Wodu (2007) reported that *L. camara* is one of the woody species that is not impacted by Elephants.

*Prosopis juliflora* was also first introduced intentionally as an agro-forestry species in the Awash Basin. It is currently distributed in Afar, Somali, Oromia, Tigray and Amhara Regions. This noxious woody species is aggressively invading pastoral areas in the Middle and Upper Awash Valley and Eastern Harerghe destroying natural pasture areas and displacing native species by forming impenetrable thickets. *Prosopis juliflora* might have been introduced to BES through livestock which having grazed in other *Prosopis* infested areas brought the seeds and defecated in BES.

The introduction and expansion of these invasive species will create dual challenges for BES. First, encroachment of these weedy species in wildlife habitats will create reduction of biodiversity, forage production and ultimately pose a threat to the integrity of the sanctuary's wildlife. Second, as people around BES depend mainly on agricultural and livestock production systems, their need for prior uncultivated land will increase as a result of infestation of their agricultural areas by various invasive species. This, coupled with the increase in human population number in those rural areas will create more pressure on wildlife habitats of the sanctuary. This situation will ultimately aggravate the already existing human-wildlife conflicts. Thus, there is a need to develop a management plan to control the spread of these invasive species in and around BES.

**Security and tribal conflict**

In Africa, several range states are currently experiencing some form of armed conflict and have little or no monitoring capabilities (Blanc *et al.*, 2003). In Ethiopia, one of the

major conservation problems can be attributed to the causes and consequences of armed conflicts both internally and with the neighboring countries (Jacobs and Schloeder, 2001). According to Blanc *et al*. (2003), civil instability and wars often lead to the mass migration of refugees into previously uninhabited areas of Elephant ranges. In Ethiopia, the population of Elephants declined from about 8,700 in 1986 (Yalden *et al*., 1986) to a total population of 2,450 in 1990 after the end of the long civil war in the country's history (Allen-Rowlandson, 1990).

The war between Ethiopia and Somalia in the 1970s also resulted in large influx of refugees in and around BES (Stephenson, 1976; Jacobs and Schloeder, 2001). During this war, there were more incidents of poaching, and the establishment of refugee settlements in the Upper Fafum and Erer Valleys pushed the Elephants to the west (Yirmed Demeke, 2009). One of the main factors which hindered protection of the sanctuary in general and African Elephants from illegal activities is the problem of security (Yirmed Demeke, 2009). According to Yirmed Demeke (2009), Elephant poaching continued even after the end of the war between Ethiopia and Somalia. The area has long been inhabited by Ogaden Liberation Front, and this continual political conflict and military strife with the government has created a huge pressure on wildlife and the environment which subsequently prevents effective conservation work.

In addition, the Ethio-Somalia war and the continued armed conflicts have allowed automatic guns to end up in the hands of local people. With the availability of guns, tribal conflicts between the Oromo and Somali are easily ignited. These situations that created civil disturbances and lack of security in the area have made it difficult for the sanctuary staff to carry out anti-poaching patrols and implement other conservation activities such as infrastructure development and surveys. Researchers also could not access some parts of the sanctuary to conduct systematic surveys of Elephant population and other studies. There are some areas along the border of Somali and Oromia Regional States where no one is allowed access to conduct ground surveys. It is obvious also that tourism is hampered due to war or conflict related security concerns and thereby limiting opportunities to generate income (Hillman, 1993). Furthermore, Cushman and Griffin

(2007) suggested that in a conflict zone such as civil unrest, the illegal poaching of Elephants and ivory trade might be used to pay for arms.

## Investment

Investment is one of the challenges of the country and the greater challenge is to balance increasing development without jeopardizing the environment. The investment direction in the country is looking at growing high yielding crops for the production of bio-fuels as an alternative to the traditional petroleum fuel. There are some companies that are investing in *Jatropha curcas* and Castor beans as a source of biodiesel, and others for the production of bio-ethanol from sugar cane and sugar beet, etc. The production of *Jatropha* and Castor beans is either through small-scale farmers and/or by clearing woodlands/dry forests and grazing lands (Rezene Fissehaie, 2009).

One of the recent phenomena was the issuance of an investment license for a German company called Flora Eco-Power P.L.C. to plant Castor beans (*Ricinus communis*) in Erer Valley as well as in Fedis and Midega Tola Districts as source of bio-diesel on 12,000 ha of land. The bottom of the valley has relatively fertile soils (WSD and EWCA, 2010) and lies within the Wabi-Shebelle River Basin, which might attract investors for agricultural investment to this area. However, it was found out that 87% of the granted land lies within BES. In March 2007, the company started to clear the natural vegetation in the northern and northeastern part of the sanctuary in the district of Midega Tola without any environmental impact assessment (EIA) (Yirmed Demeke and Negusu Aklilu, 2008).

The Erer Valley forms the core habitat for the endangered African Elephant (Anteneh Belayneh and Feaven Workeye, 2008). According to Anteneh Belayneh (2006), a total of 237 plant species in 57 families were identified in this valley. It is obvious that such investment activities will permanently destroy the wild animals' habitat.

According to the EIA report later conducted by Lisanework Nigatu *et al.* (2007), the portion of the granted area which was cultivated by the company is a seasonal pass route for Elephants in search of food and water. Flora Eco-Power cultivate Elephant ranges at Bilusuma, Negaya Midega, Mudi Tola, Lench and Oereinsa villages covering an area of 12,000 ha (WSD and EWCA, 2010; Figure 6.1). Agricultural practices with non-food crops in and around protected areas has triple impacts: destroying wildlife habitats directly and reducing food crop production, and grazing lands indirectly and increase the use of wildlife areas by people. Thus, considering the biodiversity potential and the value of the sanctuary as critical habitat for the remaining Elephant population, and the risks of the negative ecological and economical impacts of exotic species on the site, the Ethiopian government stopped the clearing of the vegetation through the countless efforts of NGOs (EWA, FfE) and the concerned federal and regional government bureaus.
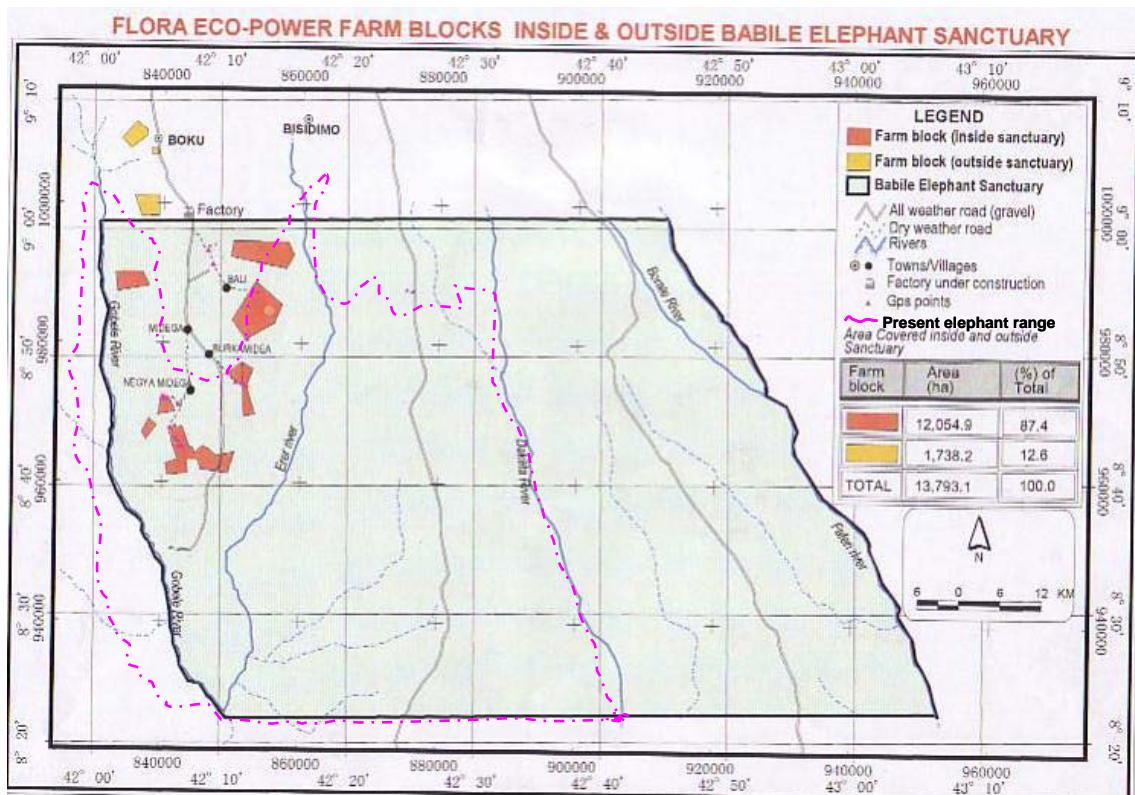


**Figure 6.1.** Flora Eco-Power farm blocks within and around BES. (Source: WSD and EWCA, 2010).

This and other similar investment proposals and implementation in areas which are important for natural resource conservation in general resulted due to lack of attention for the conservation of natural resources in general and lack of communication between the agencies responsible for conservation of natural resources and those for investment at all levels. More importantly, there is a need for natural resource conservation agencies to communicate with the decision makers and others whose actions affect the conservation of natural resources in general and important species in particular at all levels. In addition, the expansion and development of biofuels needs a clear policy and strategy that is based on sufficient knowledge and planning (Rezene Fissehaie, 2009). Without sufficient preparation and policy support, development options can impact negatively on production of food crops and conservation of natural resources.

The establishment of the new and semi-autonomous Authority (EWCA), responsible for wildlife conservation and development has the opportunity of showing the direct economic benefit of PAs from tourism on top of their huge ecological significance. The success of such efforts will help to protect these areas and generate sustainable benefits from tourism and ecological functions as opposed to the sole purpose of quick economic benefits. A recent study assessed the monetary value of the environmental services of Ethiopia's protected areas (ÖBF, 2009). Based on this study, it was estimated that BES could generate $81-2,600 million per annum for uses such as watershed protection, provision of clean water and the associated filtration and storage functions, soil stabilization, erosion control, and climatic stabilization. Furthermore, an additional $52,113,124 per annum was also estimated for carbon value for this PA alone (ÖBF, 2009).

**Legal status**

With the exception of Awash and Simen Mountains NPs, most protected areas of the country are not legally gazetted. Babile Elephant Sanctuary is not different from the others: it was established 40 years ago and is nationally and internationally recognized

site for conservation of Elephants; its boundary was demarcated but does not have legal status. On top of this, it does not have adequate trained personnel, its infrastructure development is low, and budget allocated for the sanctuary has never been sufficient since its establishment.

In 2008, a group of experts from Oromia and Somali Regional states, EWCA and WSD have revised the old boundary and re-defined it (Figure 4.3). This was mainly to exclude the intensively used areas from the current boundary. With the current interest of the government to upgrade PAs for tourism, it will be to its advantage for PAs like BES to get legal status. In addition, long-term sustainability of PAs can be ensured with effective law enforcement and community involvement.

# 7 Vision, Mission, Operating Principles and Management Goals

## 7.1. *Vision of BES*

To be a representative in sustainable conservation of the unique biological diversity and landscapes.

## 7.2. *Mission of BES*

To protect wildlife resources based on sufficient scientific knowledge and participatory principles for the benefit of the present and future generations.

## 7.3. *Operating/Guiding Principles and Attributes of BES*

The most important values which serve as guiding principles that the management and employee of BES will develop and enhance are:

**Excellence:**

Setting the highest possible standards of leadership and services in the management of BES, and to visitors and partners respectively.

**Environmental ethics:**

Embrace and be guided by environmental ethics in the management of the sanctuary given its national and international importance.

**Effective management:**

Appropriate management structures and professional performance management philosophy that is goal oriented and measurable at all times.

**Learning organization:**

A learning organization that adapts to its environment and promotes creativity, transformation and innovation within and outside the sanctuary.

**Communication:**

Transparent and open communication and sharing of information within and outside the organization.

**Employee development:**

Defining roles, responsibilities and performance outputs of personnel and providing developmental opportunities and training so that employees have the tools to effectively carry out their duties.

**Honesty and integrity:**

Honesty, integrity and ethical behavior in the management process and in the utilization of institutional resources.

**Discipline:**

Discipline, teamwork, equal opportunity and mutual respect among members of staff.

**Productive partnerships:**

Collaborating with federal, regional and local government agencies, other stakeholders and local communities to work towards common goals.

**Involvement**

Provide opportunities to local communities to participate in the conservation and management of the sanctuary.

**Customer service:**

Providing the highest possible standards of service to meet the needs of the organizations visitors and partners.

**Equity and justice:**

Treat all stakeholders and partners with equity and justice.

## 7.4. Attributes of BES

**Biodiversity and environmental attributes**

- Unique fauna and flora with national and international significance
    - African Elephants and Black-manned Lions;
    - Endemic and restricted birds (Salvadori's serin and Black-winged lovebird); 27 Somali-Masai biome species of birds;
    - Endemic plants - *Erythrina burana* and *Pelargonium erlangerianum* and 18 other restricted plant species
- Unique scenery and landscape features- Gara Muleta Mountain and spectacularly arranged rock outcrops of the Dakata Valley
- Geology of the area which supports rich biodiversity
- World Heritage Site – Harer Jegol, the Fortified Historic Town

**Economic attributes**

- The sanctuary could serve as one of tourist destination along the route together with other PAs such as Awash NP.
- The presence of the nearby Cultural World Heritage Site (Harer Jegol, the Fortified Historic Town), a historical site (the prison house for Lij Eyasu), and local cultures strengthen the potential of tourism opportunities in the region.

**Socio-political attributes**

- The unique cultural heritage and historic sites will contribute to the diversity of the sanctuary to increase its tourism potential,
- Involvement of local communities and authorities in the re-demarcation of the boundary establishes ongoing relationship between the sanctuary's management, and local communities and district authorities.
- There is a strong political support from the government for management of PAs and development of tourism facilities by establishing semi-autonomous government body (EWCA) to administer 13 PAs including BES.
- Ethiopia is a signatory to international conventions and treaties (CITES, CBD, etc) which will strengthen its conservation efforts.
- There is an opportunity to use the management plan to coordinate research and monitoring activities with international and national initiatives through the existing research and monitoring activities on African Elephant.

## 7.5. *Goal of BES*

The objectives for the management of BES focus on biodiversity conservation, conflict mitigation, research and monitoring, education and finally recreation and tourism. All focus areas will be designed to provide protection and conservation of Elephants and Black-manned Lions as well as other biodiversity, maintain the key ecological composition, functions and processes, and ultimately utilize its tourism potential. These objectives are consistent with the IUCN category II, NP Park management category and form the basis for the management of BES as described in Chapter six.

Three strategic goals that define the overall direction of the sanctuary are identified which will provide a unifying theme for its strategic and operational objectives, programs and activities. These are:

**Biodiversity conservation, protection and management**

➢ To ensure BES conserves a representative biological and ecological pattern and processes which will support the long-term persistence of biodiversity.

➢ To ensure that the present trend of depletion of biodiversity resources in BES in general and that of African Elephants and Black-manned Lions in particular is reversed and a future increase in biodiversity resources and rehabilitation of degraded areas will be translated into increased production and hence poverty alleviation and economic benefit from sustainable tourism.

➢ To promote education, scientific research and monitoring on the biological, geophysical and cultural heritage of BES and the surrounding areas.

**Building partnerships with communities and other stakeholders**

➢ To operate within the umbrella of various national, regional and international policy, regulations and conventions and seek to increase and enhance local and international cooperation in the protection and management of the African Elephants, their habitats and the whole ecosystem.

➢ To limit/minimize present and potential inappropriate land-use and illegal resource use pressures, and lessen human-wildlife conflict through continuous engagement with communities, appropriate local and regional authorities and other stakeholders.

**Building sustainable mechanisms for organizational effectiveness**

➢ To improve the management which includes enough skilled and accountable staff and appropriate institutional structure and development of infrastructure in order to advance the effectiveness in achieving the core conservation objectives.

# 8 Wildlife Management and Development Recommendations

## 8.1 Major management priorities

Even though the sanctuary will need to dwell on a number of issues that relate to managing wildlife, their habitat and communities in and around its borders, the team has agreed that the following six priority areas should be given precedence over other tasks in the coming five years.

1. *Upgrading and gazetting the sanctuary*
2. *Capacity building*
3. *Conservation of a viable Elephant population*
4. *Human-wildlife conflict resolution activities*
5. *Monitoring and evaluation of resources and activities*
6. *Promoting scientific research and awareness creation*
7. *Promote eco-tourism*

## 8.2 Wildlife Management Recommendations

### 8.2.1 Upgrading the sanctuary

Besides its role of conserving a relic Elephant population in the Horn of Africa, BES plays a significant role in maintaining ecological services and conserving various fauna and flora. Babile Elephant Sanctuary has unique category II features that differ from category IV (sanctuary) in the following ways:

*Size: -* Babile Elephant Sanctuary is immense, covering an area of 8,388 km2. Its size is large enough to accomplish principal objectives of protected area management and support viable populations of flora and fauna. It also provides crucial habitat protecting the wilderness area along the Gobele, Erer, Dakata and Fafum Valleys.

*Richness and diversity: -* Babile Elephant Sanctuary consists of large mammals including Elephants, Black manned Lions and Leopards. Greater kudus, Lesser Kudus, Dik-diks (Salt's and Gunther's) and African Civet Cats, are also known to occur. It supports over 191 species of birds including the endemic Salvadori's Serin, The Salvadori's Serin is a range-restricted species in the eastern lowlands. It is also home for 27 Somali-Masai biome bird species and is recognized as one of 73 IBA sites (EWNHS, 1996).

*Degree of naturalness: -* With the exception of seasonal disturbance of Somali and Oromo pastoralists and agro-pastoralists with their livestock, *BES* is relatively intact with minimum human influence. The site plays a significant role in watershed management. This aspect helps to sustain millions of livelihoods and biodiversity downstream.

*Rarity: -*. It not only supports an important population of the African Elephants but also other endangered and rare species like, Black-manned Lions, Leopards, as well as lower risk but conservation dependent species like Greater and Lesser kudus. It is also home for the endemic Salvadori's serin and Black-winged lovebird.

*Uniqueness: -* The vegetation of the sanctuary could act as a "*Green Guard"* due to its function of protecting not only the region but also the whole country against the expansion of deserts. This aspect has important values of climate control and modification.

*Potential Value: -* With sound management and protection measures in place, the area has the potential for restoration of lost wildlife corridors. This can attract more tourism to visit its unique fauna and flora, spectacular landscape as well as historical and cultural features. It has the potential to be one of the best tourist destinations on the eastern route.

Therefore we strongly recommend that the sanctuary be upgraded to **National Park** (Category II) level so as to protect the diversified fauna and flora.

### 8.2.2 Boundary modification

Due to expanding settlements and adverse human activities, modification of the sanctuary's boundaries has become necessary. Midega Tola Woreda has been established within the sanctuary and there are settlers who claim residential rights in the northern and eastern part of the sanctuary. In addition, Flora Eco-Power farm, residents from surrounding districts have all settled inside and/at the periphery of the valleys. Expanding settlements will inevitably lead to aggravated land use conflict and management constraints. In the best interests of this protected area recommendations support the idea of moving the park area towards the south (see Figure 4.3). By doing so, the new park area can accommodate some of the important wildlife ranges which otherwise are presently situated outside the park.

According to this sanctuary boundary, former sanctuary areas to the north especially in Fedis and Midega Tola Districts and northeast of Babile-Somali District have been excised. A total of 1,507 km$^2$ area has been relinquished from the former sanctuary. This includes sanctuary about 768 km$^2$ and 739 km$^2$ by Fedis and Babile-Somali villagers respectively. There is also an estimated 12,000 ha plot of land by Flora Eco-Power P.L.C. within this total.

On the other hand, relatively free wildlife ranges in the southern and western part of the former sanctuary have been included in the sanctuary area. The area of the new sanctuary comes to a total of 8,388 km$^2$ which is an increase of 1,406 km$^2$ as compared to the old boundary. The land taken for settlements and farms should be compensated from the sanctuary's adjacent areas (EWCA and WSD, 2010). New additions to the park are frequented by Elephants and have relatively undisturbed vegetation cover. Areas in the north along Erer Valley (23 km$^2$) and in the west of Gobele Valley (732 km$^2$) was obtained based on the decisions and agreements of the boundary demarcating team. In addition, based on satellite image assessments, an estimated area of 2,158 km$^2$ is proposed to be included in the new sanctuary excised from Harer CHA (see figure 4.5). On the other hand, considering regular Elephant movements, settlement patterns (and

population pressure) along the main channels of the Erer and Gobele Valleys, decision was reached to extend the northern borders a few kilometers north. This extension is in line with the beacons put up in collaboration with concerned officials. For details of boundary description see Appendix 4.

### 8.2.3   Management zones

Zoning is a management tool that is used to separate conflicting use or uneven distribution of resources. Currently over two third of the sanctuary is occupied with provisionally and/or permanently settled communities from the Oromia and Somali ethnic groups. Though most of the highly settled and cultivated areas are excluded in the revised tentative boundary, most of the people in the Oromia and Somali-Babile Districts are pastoralists. These people are known to encroach Elephant range mainly for grazing and reside in scattered settlements within the center of the sanctuary.  These sites are least preferred by Elephants. According to existing reality, it is impracticable to resettle people elsewhere. Thus, zoning is required in order to achieve the management objectives and to specify activities that need to be carried out at different sites of the sanctuary. Once delineated on the map, each zone would be demarcated on the ground. Accordingly, the sanctuary area has been divided into the following three major zones: Biodiversity Conservation Zone, Integrated Resource Use Zone (Buffer Zone) and Community Use Zone (Figure 8.1).

### a.   Biodiversity Conservation Zone (BCZ)

This zone will incorporate the main Elephant range areas including the Erer and Gobele Valleys and the extended boundaries to the south and west. This area is largely unexploited and fairly in pristine state and only serves as dry season watering point for local residents. The main management objective here should be aimed at protection/conservation and recreational use and other economic activities like cultivation, settlement and other adverse human activities should not be allowed. Biodiversity Conservation Zone will include all newly modified boundaries in the

western, central and southern parts of the sanctuary characterized by seasonal movement of Elephants. This zone also supports several mammalian species. The area of this zone is approximately 7,943 km$^2$ comprising 88.6 % of the sanctuary. BCZ should include corridors that are seasonally used by Elephants and other wildlife as indicated in other sections of the document.
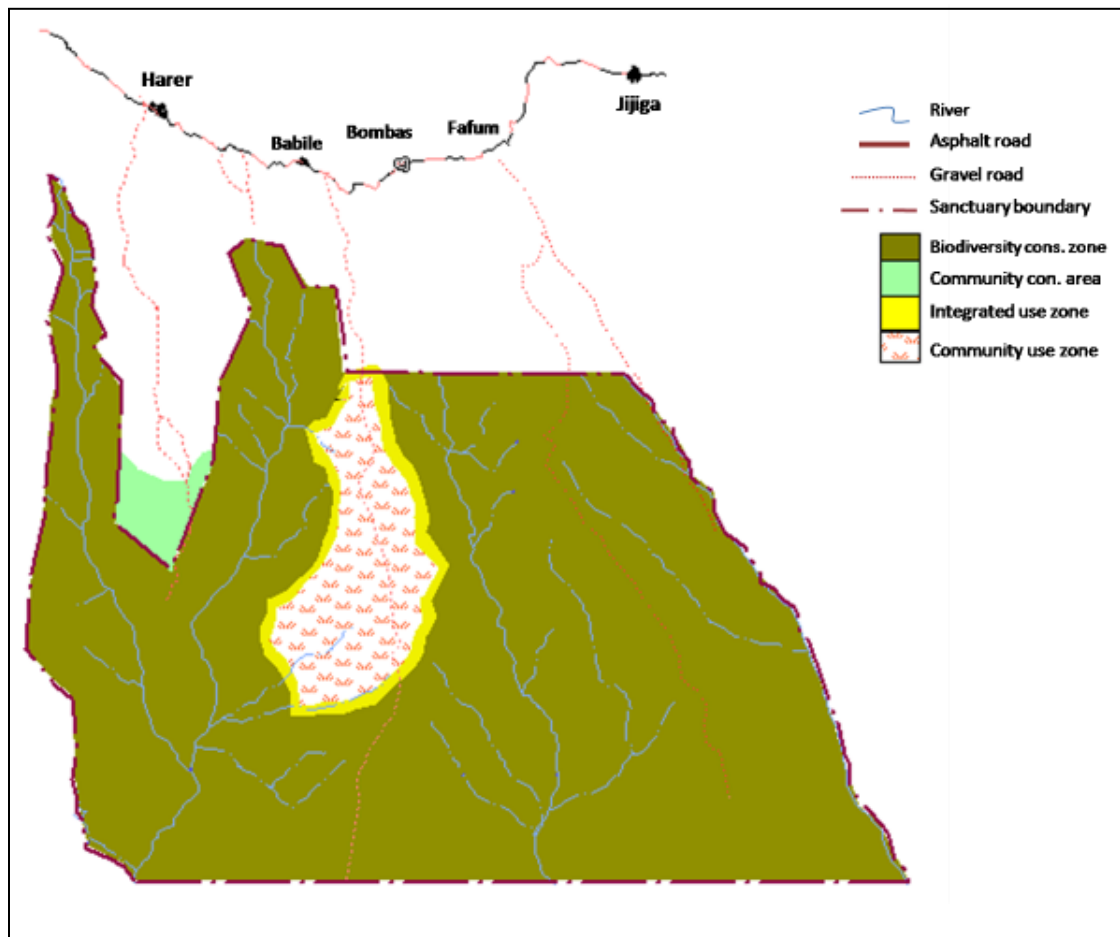


**Figure 8.1.** Map showing zonation of the new proposed NP.

Biodiversity Conservation Zone is primarily a conservation zone as the name indicates. Community resource use is strictly prohibited with the exception of seasonal access to watering sites and cultural sites with close supervision of the park management. Other adverse human activities such as settlement and related developments, farming, resource extraction (fuel wood, charcoal production), and grazing are strictly prohibited.

The main uses to be allowed in the BCZ are:

- Scientific research and education,
- Developments which strengthen the management of the NP,
- Tourism and other low impact developments for recreational purposes,
- Controlled access to watering and cultural sites
- Collection of medicinal plants

**b. Integrated Resource Use Zone (Buffer Zone) (IRUZ)**

The term Buffer Zone refers to a zone, which serves as a buffer between conservation and development activities (DSE, 1999). Thus, the buffer zone is located in the eastern part of the sanctuary, next to the BCZ where a relatively high human pressure or encroachment is expected. Although not included in our calculation, it is crucial to leave a buffer zone around the boundary of the sanctuary. The total area of the proposed buffer zone is about 226.63 km$^2$, and comprises 2.5 % of the park area.

As indicated earlier and shown in Figure 8.1, in addition to the existing human pressure, the northern part of the proposed park, the area between the Erer and Gobele Valleys, has been proposed for large scale agricultural projects under the Flora Eco-Power project. This area is densely settled with local residents. Hence, management in this zone is aimed at absorbing or reducing the conflicting land use or encroachment pressure from surrounding areas. Based on a binding agreement between the park office and the local communities, some manipulation of natural resources will be permitted. The manipulation may include establishment of community woodlots, harvesting of fuel wood or construction wood, grazing and specific agricultural development.

The management should strive to encourage voluntary resettlement measures especially for the agro-pastoralist communities living at present in core Elephant ranges within the sanctuary. One of the methods of encouraging voluntary resettlement is to provide social services and facilities outside the sanctuary's boundaries thereby attracting human

population from the core areas. This will protect further fragmentation and restore damaged natural areas of the sanctuary.

This zone is a transitional zone between the core area (BCZ) and intensive community-use zone. The primary purpose of this zone is to act as a buffer for the BCZ so as to reduce adverse human activities on the core area. Establishment of permanent settlements and social services (e.g. school, clinic, and public road), and farming are not permitted in this zone.

The main uses to be allowed in IRUZ are:
- All uses mentioned above allowed in the BCZ,
- Community uses such as bee keeping, wild honey collection, seasonal grazing, limited fuel-wood collection for domestic use,
- All pertinent environmentally friendly developments can only be permitted based on detailed EIA.

c. **Community Use Zone (CUZ)**

Areas surrounding the buffer zone, which used to be former Elephant ranges, have been designated as areas of CUZ. The impact of road construction, expanding settlements and related developments will be kept to minimum and natural aspects will be maintained. However, measures to improve wildlife viewing and local income will be encouraged. These can include the construction of obtrusive hides, watchtowers, salt licks, cultural dance and local ornaments. The objective is also to satisfy visitors' need of accommodation, fulfill management objectives and services to local people.

Management activities will be carried out jointly with the surrounding local community, wherever necessary. Thus, traditional uses of resources may be allowed as long as they do not hamper the objective of conservation. In other words, traditional extraction of resources may be permitted, based on sustainable basis. The main goal would be to work

towards the avoidance or major reduction of these practices in the future. Land use practices should be limited to wildlife resources management.

The CUZ comprises some portions in Babile-Somali District and other settlement areas that are occasionally visited by Elephants and other wild mammals. It covers a total area of about 791.76 km$^2$, and consists 8.8 % of the park area. As noted above, the management of the CUZ will be carried out jointly with the district officials and neighboring PAs/Kebeles. To this end, conflict management strategies will be developed in collaboration with local communities.

Community use zone is proposed because the team believed that resettling residents of Dakata and Fafum Valleys may not be achieved within the coming five years mainly due to security and the capacity of the regional government. However, on a long-term basis, there is a need to resettle these communities outside the PA in order to regain the historical range of Elephants and avoid human-wildlife conflicts. To achieve this, we recommend conducting sound community outreach programs that enable local communities to have alternative livelihoods (included in the MP) and through time using pull factors to convince local residents to resettle voluntarily outside the proposed national park. In the meantime, it is necessary to identify potential settlement sites that can accommodate all settlers who are currently within the Elephant range.

Thus, for the purpose of this Management Plan, the major target of the CUZ is to integrate the needs of local communities and wildlife conservation through long-lasting use of resources therein and promotion of environmentally friendly development activities to minimize the potential impact of local residents on the sanctuary.

The main use to be allowed in CUZ includes:
- All uses allowed in BCZ and IRUZ
- Construction of temporary/mobile social services (clinics, veterinary services, etc.,)
- Road construction based on EIA

- Livestock fattening program
- Cattle grazing and watering
- Sustainable use of forest products for domestic use

### 8.2.4 Naming of the Proposed NP

Babile Elephant Sanctuary is named after the name of one of the 12 districts that share boundary with the local residents of other districts feel that the present name does not represent the entire ecosystem of the sanctuary. As a result, most of the residents living outside Babile District do not feel a sense of ownership of the sanctuary and have frequently asked the sanctuary's office as well as the re-demarcation team to change its name so that it can represent all surrounding residents in the Somali and Oromia Regions. During the two workshops conducted in Harer and Jijiga one of the main question raised by participants from both Regions was to know the reason why the sanctuary was named after Babile and insisted to see a name change in envisaged management plans. Similar questions were raised during focus group discussions during the ground demarcation (EWCA and WSD, 2010).

The team suggested the following ideas for discussion to name the proposed NP:
- Gobele-Fafum Elephant NP
- Eastern Ethiopia Elephant NP
- Harerghe Elephant NP

### 8.2.5 Gazettement of the Proposed NP

To date, BES has not been gazetted. This has by large contributed to the mismanagement of wildlife resources in the valleys. Its poor legal status and lack of recognition are among the main reasons for the loss of former ranges in the northern and western parts of the Park have been taken up by illegally settled people in Midega Tola and Fedis Districts. These illegal settlements have effectively blocked s as they are located on corridors used by the s. The new boundary of the Park has recently been modified to

reduce conflict zones between settlers and wildlife. This new demarcation will also act as a strategy to secure remaining wildlife areas in the valleys and upgrade the sanctuary's conservation status.

One of the sanctuary's main objectives in line with its future upgraded legal status is to take up the role of providing pertinent information on appropriate development activities that do not create conflict with its objectives. Social programs and alternative livelihoods (discussed in the next section) will be one useful approach to limit encroachment and reduce pressure of local communities on the sanctuary. The team strongly recommends the gazettement of the proposed NP as soon as possible, on the basis of the newly modified boundaries. In addition to giving the sanctuary a legal ground and upgrading to a NP level, it is important to limit/prevent further human encroachment on wildlife habitats. This obviously helps to prevent further wildlife habitat fragmentation and human-wildlife conflict. Especially, destructive resource uses such as cultivation (both subsistence and large-scale) should be prevented from the 'core wildlife area'.

### 8.2.6  Administration

The essential measures for sound resource management includes, but is not limited to, official recognition of the  area by all concerned bodies, well trained and committed management staff, close supervision by higher officials and take up-to-date corrective measures. Facilitation of reliable logistics (reliable vehicles, camping and communication materials), redefining the boundary of the sanctuary, establishment of  zones based on the potential and purpose of the specific sites, controlled access to seasonal grazing sites are crucial. It is critical to identify travel routes for livestock seasonal crossing to grazing and watering sites through the sanctuary area and to identify alternative watering and grazing sites in the long-term. This should be done based on detailed assessment and investigation of the process. To secure the entire range is crucial to control all destructive human activities within the sanctuary area including preserving plains, wildlife corridors and River banks that support globally endangered and threatened species.  It is crucial to eliminate/mitigate any human-related impacts that threaten abiotic, biotic and scenic

resources. It is also necessary to establish a surveillance and anti-poaching unit to halt illegal killing of s and other wildlife. It will be mandatory to involve key stakeholders particularly local communities in all steps of management and create benefit sharing mechanisms (e.g. employment).

### 8.2.7 Institutional framework

Ethiopian Wildlife Conservation Authority's recent structure looks sound to realize the mission and vision of the Authority in general and BES in particular. The need to work with communities is strongly addressed in the recent wildlife policy and strategy of the country. However, institutional structure to involve local communities and other key stakeholders seems rather weak as there is absence of a clearly defined community section at federal and site level. Even though, conservation and development of wildlife resources cannot be achieved without sound collaboration of local communities, community wildlife service are poorly addressed in the present structure and not treated as a cross- sectoral issue. On the other hand, there appears to be a unified gender affairs section at federal level but is not well-represented at site level. The team recommends revising the existing institutional structure to properly address the cross-sectoral issues like research and community wildlife service in such a way that it properly addresses participatory/community based wildlife management approach and research work.

### 8.2.8 Capacity building/Human resource

The management staffs of BES are not well trained and equipped, except 27 scouts recently received short-term training in basic surveillance techniques. It is crucial to recruit more scouts and other management staff as indicated in the recently permitted human resource of the sanctuary and train on basic wildlife management skills including anti-poaching, communication skills and modern patrol reporting system plus strengthening the capacity of higher staff through short-term and long-term training. It is necessary to conduct conservation education, establish nature club to raise the level of

awareness of students, local communities and other key stakeholders and supplement with seminars, workshops and meetings. Experience sharing through cross visit, country visit and other educational tours for staff members, key community and Woreda representatives should be included in the capacity building.

### 8.2.9 Solving the security problems

The sanctuary's future depends entirely on political stability in the area. At present there are tribal conflicts between groups. It is important to engage in negotiations between the tribes by establishing a committee which has members from all sides, the local government authorities and BES. It is crucial to solve the conflict of the Ogaden Liberation Front with the Government. Without this stability, it will be difficult to conduct patrol to control illegal activities and establish infrastructures. However, this is beyond the capability of the sanctuary's administration and there is a need to work closely with relevant sectors at federal level.

### 8.2.10 Research and monitoring

At present, the sanctuary does not have a herbarium and research center. It has been noted that it does not also have a well established data collection and inventory system. Research and monitoring are an important aspect that can assist day-to-day management decisions. Research with an applied nature can be a useful tool to alleviate management problems including human-wildlife conflict, control of invasive species and negative attitudes of local communities towards wildlife conservation. Very little is known about the ecology of the sanctuary's wildlife including aspects of movement, home range, breeding and habitat use. It is recommended that the following research and monitoring activities should be conducted:

➢ Ground survey of all wild animals (mammals, birds, reptiles, etc) and document habitat types for each species
➢ Investigate the spatial and temporal movements of Elephants

- Determine the reproductive timing of Elephants in relation to resource availability (forage and water) and fluctuation of climatic conditions (e.g., drought occurrence),
- Ecological study on Black-manned Lion, Leopard and Salvador's Serin,
- Map the distribution of invasive species such as *P. juliflora* and *P. hysterophorus, L. camara*, and other introduced species and plan for control,
- Collection and identification of plant species and finally establish a herbarium,
- Establish a museum with specimens found killed in the sanctuary,
- Determine the distribution of Elephants on privately cultivated land adjacent to the sanctuary to understand the human-Elephant conflict in the area,
- Determine the attitude of communities towards Elephant conservation and the management of BES,
- Continue investigation on human-wildlife conflicts,
- Map land-use and land-cover patterns of the weredas within and adjoining the sanctuary,
- Collect environmental data such as rainfall, temperature, relative humidity, etc.

### 8.2.11 Eradicate/control of invasive species

As the distribution of the aggressive *P. juliflora* is limited within the sanctuary; it is recommended that the roots of individual plants be dug out to eradicate the plant. The sanctuary should be monitored for this species since many areas in Somali Regional States are suffering from its invasion. *Prosopis juliflora* is one of the world's worst invasive plant species which has a serious impact on biodiversity. It is also necessary to provide awareness to institutions and local communities about its impact on agricultural and livestock grazing areas and wildlife habitats.

### 8.2.12 Rehabilitate wildlife habitats

Ethiopia is currently joining the world growing high-yielding crops for the production of bio-fuels. This alternative source of energy will help address imminent shortage and

increasing price of natural fuels and reduce the impacts of greenhouse gas emissions on climate change. It is obvious that production of bio-fuel competes with food production. This competition will result in shortage of production and increase of cost of food. The argument bio-fuel crops such as Castor and Jatropha beans grow on lands not suitable for high yielding agriculture cannot rule out the impact of growing such crops on forests, wildlife habitats and agricultural areas. This in fact threatens pastoralism in semi-arid areas. Flora Eco-Power cultivated castor beans on about 12,000 ha of important wildlife habitat within BES's boundaries of. With much effort from Government and non-Government institutions and conservation groups, the impact of such farming on the range of Elephants was finally recognized. Formerly cultivated areas of the sanctuary should be rehabilitated to serve its original purpose: shelter and forage for Elephants and other wild animals and development of the sanctuary for ecotourism. In addition, the few sites which have been cultivated by individual farms and became free needs to be monitored against the invasion of noxious weeds.

### 8.2.13 Awareness creation and conservation education

Awareness creation is an activity that serves to communicate the ideals of the sanctuary to various target groups. These target groups are the different stakeholders living in and around the sanctuary. Target groups also include politicians, students, various local administrative bodies and tourists. This objective is significant enough to be headed by a section in the management of the sanctuary. The person responsible should be able to develop programs, talk and discuss management issues with various stakeholders and lead the sanctuary's aims of creating a strong and viable protected area in the area. Awareness creation is a management tool that will assist and support the value of the sanctuary to various people including communities at strategic sites along the movement corridors of the Elephant. Some of the crucial issues that should be addressed are the impacts of invasive species on the landscape and specifically the habitat of wildlife in the sanctuary. Another method is to work with youth in schools bordering the sanctuary by creating wildlife clubs. These wildlife clubs can become focal points that will work with the sanctuary to conserve its resources.

Other tasks include but are not limited to:

- Organizing available information on the conservation and management of the Elephant and dissemination of reliable information to local communities, authorities, the scientific community, national and international conservation organizations and policy and decision makers of the country,
- Building appropriate capacity to implement the above.

### 8.2.14 Resolution of Human-Wildlife Conflict

This issue is perhaps the most important management problem at the moment which can have a disastrous effect on the survival of the sanctuary itself. It requires a specialized and long-term commitment and effort. Its solution cannot and should not be expected to come forth from one side. On the other hand, it calls for collaborative measures from all sides and in particular from the management of the sanctuary, local communities affected, administrative bodies at all levels and international conservation bodies  A country's legislation and policy arenas are very important in this aspect. Though the existing wildlife policy has important sections relating to human-wildlife conflict, implementation at site level is not strong. There is a need to develop site-specific human-wildlife conflict management manuals. On the other hand, there is an understanding that conflict arises as competition for limited water and grazing resources. Developing water resources outside sanctuary boundaries can help alleviate the problem in the long run.

The other solution is to curb the expansion of human settlements within the sanctuary in the future. This is an important measure but its implementation can be insurmountable unless the sanctuary is given a legal status. Communication and awareness raising can contribute much to decreasing if not alleviating human-wildlife conflict in the area. Working closely with various groups and getting the message relating to the importance of the sanctuary to the everyday livelihoods of surrounding people is considered crucial as well.

### 8.2.15 Eco-tourism development

Although tourism cannot be taken as a fundamental reason for the establishment of a wildlife area, it can be taken as a chief motive to earn foreign currency, provide recreation, develop trade and promote local economy in various ways. It is crucial to advertise the relative importance of Babile area. This can be done once potential tourist attraction sites, camping sites, potable water, and other facilities are identified, established and developed. Wildlife viewing, placement of nature trails along the Erer and Dakata valleys, bird watching, cultural sites, and the scenery are some of the valuable recreation sites for tourists.

The culture of local communities, their costumes, type of houses, handicrafts, cultural music and dance are undoubtedly great attractions for all visitors. As mentioned elsewhere **political instability** in the area is a precondition for ecotourism development and generation of revenues from the sector. This should be followed by the **development of infrastructure** (roads), campsites, nature hikes, museum (from the carcasses found within and around the sanctuary), information center, training of knowledgeable guides, lodges, etc. **Advertisement** is a means of marketing tourism at BES both nationally and internationally. Various means can be used to advertise tourism including a website, brochures, posters etc. The other significant approach would be to develop suitable **Accommodation** for tourists**.** Campsites and other utilities for tourists should be developed at suitable sites. At the same time private investors should be encouraged to build standard hotels.

### 8.2.16 Infrastructure development

*Headquarters***:**

It is recommended that the headquarters for BES to be established in Babile Town. Babile provides a strategic site to reach both Somali and Oromia Regions. On the other hand, the Erer Valley outpost should be upgraded to a sub-headquarter level with an

assistant warden. Erer Valley is a strategic site to protect core Elephant range and promote wildlife tourism in the area. It also helps to realize sound surveillance along Gobele and Erer valleys. The headquarters should contain administrative offices for warden, biologist, community officer, tourism officer, anti-poaching and development officer, supporting staff, wildlife scouts, staff residential houses, store, water well and other basic needs. During the construction of the headquarters, the present and future needs of the sanctuary should be taken in to consideration. An information centre should be also established at Harer Town to provide the required service for tourists visiting the sanctuary and other tourist attractions of the region.

*Outposts*: Currently BES has three outposts constructed at three strategic sites*.* However, due to the shape and size of the sanctuary, surveillance from existing outposts alone does not guarantee long lasting survival of Elephants and other wildlife resources in the valle*y*. Therefore, at least four additional outposts should be established, each with 6 duplex, at Midega Tola, Ali Ethiopia, Shenile and Fiq for effective patrolling and development work.

*Road construction* - Babile Elephant Sanctuary has limited road network within the sanctuary except public roads that join Babile with Fiq, Fedis with Midega Tola and other roads interconnecting districts. The major poaching sites in Erer and Gobele Valleys are not accessible by vehicles. There are inadequate roads that can interconnect patrol sites, tourist attraction sites and other strategic points. It is recommended that new roads be opened to and from outposts and headquarters. Thus, it is crucial to open roads between Erer camp to the junction of the Gobele and Erer Valleys, from Erer camp to Midaga Tola following the western boundary of the sanctuary on the Erer side to join with the proposed outpost south of Midaga Tola District. Another road should be constructed along the eastern boundary of the sanctuary on the Gobele side. Within the Gobele and Erer Valleys, network of roads should be opened to tourist attraction and camping sites based on detailed investigation. In the long run, there is a need to construct a road that encircles the sanctuary for sound conservation and development activities. It is also pertinent to maintain the existing roads that connect the park with districts of Oromia and Somali Regions surrounding the sanctuary. It is difficult to put the exact length of roads

that need to be constructed in the sanctuary. In the long run, with comprehensive information on the needs of the sanctuary for various uses, i.e. tourist access tracks, management roads, etc. a network of roads that will interconnect the above mentioned sites is necessary. From existing data, it is recommended to construct at least 250 km new roads and maintain 300 km existing roads.

## 8.3 Development Recommendations

**Social programs and Alternative Livelihoods for Local Communities**

It is important to integrate social programs with the management of the sanctuary and create alternative livelihoods to reduce the impacts of human-related activities within and around the sanctuary. Such activities will help alleviate poverty by creating alternative livelihoods for communities and improve their lives by providing basic necessities. Lack of rain in the area is one of the problems for shortage of agricultural production. The sanctuary should not be the sole implementer of such programs but needs to work hand-in-hand with various government and non-government institutions. Local communities living around the sanctuary do not have adequate social services including schools, clinics, potable water and veterinary services. There is a need to accommodate community needs based on discussions with community leaders and other key stakeholders. This includes, but is not limited to construction of water wells, water catchments sites, and development of watering points for livestock.

Other important considerations to improve alternative livelihoods include:

➢ Reclamation of degraded farmlands - As reported by Stephenson (1976), there is unsustainable land utilization since the establishment of the sanctuary. Reclaiming the degraded lands and awareness creation on how to use farm lands (erosion control, types of ploughing, afforestation with indigenous trees, etc.) sustainably is one way to reduce the need for more cultivation lands.

- ➢ Veterinary Service – improved and organized veterinary service would help to provide large-scale vaccinations in all the villages within and around the sanctuary, particularly around the agro-pastoralist areas of the Somali Region who move from place to place in search of forage and water for their livestock. Effective veterinary service in this area would maintain the livestock wealth of the community and prevent transmission of diseases from livestock to wild animals.
- ➢ Some of the other approaches would be to introduce improved breeds and cross-breeds to the local communities, introduction of improved pasture management.
- ➢ Training and assistance of the community to practice feeding their cattle with cut and carry system.
- ➢ To promote sport hunting outside the sanctuary with benefits shared or used by the local communities.
- ➢ To promote community conservation programs surrounding the sanctuary.
- ➢ To promote off-farm job opportunities.
- ➢ To promote eco-tourism development, help people sell their handcrafts, facilitate community tourist guide training, and get revenue from tourists.

# 9 Strategic Objectives, Operational Objectives and Activities

## 9.1 Strategic and Operational Objectives

Wildlife managers in Africa have struggled to meet their conservation targets given the financial constraints, low institutional capacity, and the ever increasing human population pressure challenges they face. Likewise, the Elephants of BES face serious threats, which primarily include illegal killing, habitat loss and/or fragmentation due to land-use changes, and human-Elephant conflicts with the increasing human population pressures. These threats might lead the isolated Elephant population of BES to local extinction if mitigation measures are not taken place. In addition, during the past four decades, lack of adequate budget, man-power and capacity for law-enforcement and other conservation activities for the management of the sanctuary was very minimal.

For effective management of the sanctuary in general and the conservation of the African Elephant in particular, the following twelve priority strategic objectives (SO) were identified. These are:

SO1. Conserve biodiversity and maintain ecological processes,

SO2. Conduct biodiversity research and monitoring,

SO3. Protect the biodiversity resources and ensure security,

SO4. Develop both human and physical resources to support viable conservation and management,

SO5. Mitigate human-wildlife conflict at BES through active stakeholder participation,

SO6. Develop compatible land use practices within and adjacent areas of BES,

SO7. Increasing protection of migratory corridors and ensure natural habitat connectivity of key wildlife habitat,

SO8. Develop efficient mechanisms, which will promote increased stakeholder support,

SO9. Devolution of management, benefits and responsibilities to other relevant institutions for the management of biological diversity, ecological and economic importance,

SO10. Improve conservation and management through National and International networking and collaboration,

SO11. Enhance communication and image of BES,

SO12. Establish and develop tourism management system for BES and local community.

These strategic objectives focus on conservation/management, strengthening the capacity and law-enforcement, involvement of the community and other stakeholders in the conservation, tourism, with continued research and monitoring to understand the resources, identify threats and to make scientific-based plans in the future. For each strategic objective, there are various operational objectives, key targets, and detailed activities which will be undertaken to meet each of the objectives. These strategic plans are designed to provide protection and conservation for the African Elephant and the other biodiversity, and maintain the key ecological processes of the area by minimizing human pressure. The length of these different conservation activities/measures will give ample opportunity to update the management plan of the sanctuary in the future plan.

Strategic objectives present an entity that is vast and rather general. This larger objective would be subdivided into manageable objectives if we are to realize it. Sub objectives or as mentioned here, *Operational Objectives*, are breakdowns of the larger strategic objective allowing a grip on the task ahead. Operational objectives are further divided into specific activities that are specific, achievable and manageable.

**Strategic Objective 1. Conserve biodiversity and maintain ecological processes**

The biodiversity conservation and ecosystem management strategy depends on a variety of successful policies applied effectively both at the landscape and reserve level to ensure protection of ecological functions, habitat restoration and ecologically sustainable use. Preserved natural areas and other reserves or protected areas are necessary but not sufficient condition for long term sustainability. Even a comprehensive protected areas system is not a panacea for sustaining ecological diversity - most biodiversity will always be found outside the reserve system. Therefore, protected areas must also be networked

and managed in concert with entire regions. The aim of this strategy is to provide a general statement of principles and policy to guide the ecosystem management program over the next 5 years.

In order to provide the foundation for the Ecosystem Management Program the following *guiding principles* are drawn from the wildlife policies and other related polices:

➢ Babile Elephant Sanctuary management will work to maintain all components and processes of the sanctuary's naturally evolving ecosystem, including the natural abundance, diversity, and ecological integrity of plants and animals.

➢ Changes occurring and effected under natural circumstances are recognized as an integral part of the functioning system of the BES.

➢ Although a non-intervention policy will be pursued in general, interference with natural processes may occur to maintain wildlife and plant species diversity, to preserve sensitive species and to restore native ecosystem functioning that has been disrupted by past or ongoing human activities.

➢ Babile Elephant Sanctuary management will influence the surrounding communities, local and district governments, and other agencies to help ensure that activities occurring outside the sanctuary do not impair the sanctuary's resources and values, especially through district planning forums or meetings.

➢ Research and monitoring programs will provide an accurate scientific basis for planning, development and management decisions in pursuit of the sanctuary's ecosystem management objectives.

**Conservation targets and key ecological attributes (KEAs)**

During the planning process, it has been developed to identify and prioritize representative ecosystem components regarding their conservation. This approach will ensure the optimal allocation of time and resources for implementing conservation strategies to protect and monitor the long-term health and functions of the BES ecosystem. The following conservation targets of BES cover the various spatial scales

and levels of biological organization from ecosystem to the level of individual species. The underlying assumption behind establishing these conservation targets and focusing on their conservation is that will also ensure the conservation of all co-occurring ecosystem components and therefore the maintenance of a healthy ecosystem.

| Key Conservation Targets | Level |
|---|---|
| 1. The downstream along the Gobele, Erer, Dakata, and Fafum Valleys | Ecosystem |
| 2. The migratory corridors | |
| 3. Riverine Forest | |
| 4. *Acacia-Commiphora* Woodland | |
| 5. Semi-arid grassland and scrubland | Community |
| 6. Evergreen and Semi-evergreen scrub | |
| 7. Important bird population | |
| 8. African Elephant | |
| 9. Other endangered or threatened mammals, birds and plants | Species |

The above conservation targets are characterized and defined by Key Ecological Attributes (KEAs) or factors such as biological composition, spatial distribution, biotic and abiotic interactions, ecological connectivity, rarity, etc. The KEAs are sensitive to change and provide the basis for monitoring the overall health of their respective conservation target. For instance the African Elephant and other threatened mammals of BES Conservation Target have been identified as requiring special management attention, and restoration actions to maintain viable population within BES.

***Operational objective 1.1 The conservation and ecological status of* BES, *Key targets enhanced and threats reduced.***

In order to achieve this desired state, a series of management targets and associated management actions or operational plans have been formulated. The core strategy in this

regard is to reduce the major or prioritized threats, under the assumption that the removal of threats will ensure the maintenance of the Conservation Targets.

**Key targets:**

> ➢ Human impacts to the rivers down streaming along the Gobele, Erer, Dakata, and Fafum Valleys monitored and minimized,
>
> ➢ Human impacts threatening the migration corridor minimized,
>
> ➢ Human impacts such as the impact of fire and deforestation within key habitats reduced, and
>
> ➢ Viable population of the African Elephant and other threatened mammals restored.

*Operational objective 1.2 Regular monitoring and assessment of key ecosystem values and ecological processes strengthened.*

The existing biodiversity and ecological monitoring system is evaluated, and the present status of the evolving ecosystem functioning is going to be assessed and understood in order to establish a sustainable and management-oriented ecological monitoring program. To achieve this desired state, a framework on ecological monitoring will be developed for future monitoring of the health of the BES ecosystem, and to provide the basis for the development of a comprehensive Ecological Monitoring Plan. The BES Ecological Monitoring Plan will monitor the health of the Babile ecosystem; that is the sustained maintenance or enhancement of the viability of the Conservation Targets. The plan will also monitor both the threats to the Conservation Targets as well as the key Ecological Attributes of the Conservation Targets.

Development of the Ecological Monitoring Plan requires a baseline to be established; not only for future comparisons but also to enable the establishment of clearly defined indicators and, where appropriate, the limits of acceptable change. The limits of acceptable change will take into account natural variability in key ecological attributes and guide conservation action aimed at managing a target's attributes within this natural

variability. Once the baseline and specific indicators are established, it will be possible to periodically collect, analyze and integrate monitoring information into management decision-making and practice.

**Key targets:**

> ➢ A framework on ecological monitoring will be developed, and the existing biodiversity and ecological monitoring system is strengthened, and
> ➢ Management decisions in the overall BES biodiversity conservation and ecological processes improved.

*Operational objective 1.3 Develop and implement viable and sustainable area management programs in biodiversity conservation and ecosystem management.*

Even if we improve the anthropogenic factors and reduce the level of human impacts on the Conservation Targets and KEAs, there are certain cases which require special concern and management interventions to sustain viability of some of the conservation targets, particularly at a species level. For instance, the African Elephant and other endangered species may require special attention and treatment in order to keep viable and optimum population within BES. To achieve this desired state, it is necessary to develop and implement a sustainable area management programs or action plans. It is also critically important to involve the local community in decision making and necessary to empower the community and other partners in developing and implementing site or area management programs in relation to ecosystem monitoring and management.

**Key targets:**

> ➢ Viability of the African Elephant population and other endangered mammalian species ensured, and
> ➢ Partnerships and collaboration among stakeholders to sustainably manage ecological processes strengthened.

**Strategic Objective 2. Conduct biodiversity research and monitoring at BES**

Biodiversity research and monitoring is an integral part of protected area management. It enhances our knowledge, improves decision making, and helps to identify monitoring indicators for biodiversity conservation. Research and monitoring is also one of the areas of interventions to measure the effectiveness of conservation and management activities and help to develop scientific research-based management plan for the future. Until recently, 30 mammal and 191 bird species were identified in the sanctuary (Yirmed Demeke, 2009). Even though it was not possible to survey some parts of the sanctuary due to security reason, 324 Elephants were counted to exist in the sanctuary by the same study.

However, the African Elephant Action Plan (2009) acknowledged that the analysis of the status of Elephant populations and their conservation across the range states is not comprehensive. In addition, though the sanctuary was primarily established for the conservation of Elephants, its potential to harbor other wild animals which are ecologically and economically important has not been thoroughly investigated due to political instability in some parts of the sanctuary as mentioned above. Thus, a complete understanding of population size, trends, and distribution, health of Elephants and other wild animals, their habitats, and the overall relationship of the sanctuary with the surrounding communities are essential for effective conservation of the sanctuary.

The following four main operational objectives have been identified as priority research and monitoring activities for improving knowledge and management of the Elephant populations, other wild animals and their habitats and ultimately assist with future management. It is important to note that all these research ideas cannot be done only by the staff of BES or the experts at the federal level. It needs a tremendous amount of expert times and incur a huge financial expenses. One way is to encourage MSc. and PhD students and volunteer researchers by posting and advertizing the issues on the EWCA website. Formal institutional linkages should be established with universities, research institutions, local and international NGOs and sponsoring institutions in order to carry out

the research and monitoring activities. There has been and will be a need for national and international partnership to offer both financial and technical support on long-term basis to conduct these and other research and monitoring activities in order to develop a comprehensive management plan for the conservation of Elephants and other wild animals. The sanctuary's personnel also need training on the techniques of inventorying, evaluation and monitoring of wildlife and their habitats.

**Key Targets:**

 ➢ The biodiversity potential of the sanctuary become fully documented,
 ➢ Data base of the natural resources of the sanctuary established,
 ➢ The status and other attributes of Elephants understood,
 ➢ Educational and research plant and animal materials are collected, identified and preserved for students and the scientific community, and
 ➢ Threats confronting the Elephants and other biodiversity identified for mitigation measures.

*Operational objective 2.1 Carry out detailed research, monitoring, inventories and regular surveys in BES.*

Baseline information on the number and distribution of Elephants and other wild animals is essential to develop a management plan for the sanctuary in general and an action plan for the species which needs special management priority in particular of the Elephant population in BES. This knowledge is essential to refine the ongoing conservation efforts and management decisions for wildlife species and their habitats. It is also important to evaluate the effectiveness of the management plan and to maximize the conservation and management activities for Elephants. Development of a comprehensive Action Plan for Elephant Conservation and Management will be constrained in the absence of greater understanding of Elephant numbers, trends and distribution. It should, however, be recognized that acquiring 'full' knowledge about all aspects of individual Elephant populations will often remain unattainable, and that decision-makers should make use of the best available information in combination with adaptive management approaches.

Ongoing monitoring is a key element of adaptive management to achieve the stated conservation goals and targets. A simple wildlife monitoring process consists of recording wildlife encounters while doing routine patrols and standardized periodical systematic surveys. The data collected over a period of time can provide insights into the population dynamics and the distribution of most wildlife species. Use of Global Positioning System (GPS), Geographic Information System (GIS) and remotely sensed data are also useful for wildlife management, habitat mapping and detecting changes in vegetation types and identify the associated problems. The staff of the sanctuary and those at the head office (EWCA) should work towards promoting high quality researches that are useful in addressing important management questions.

It is important to note that a number of equipments and books such as binoculars, GPS, computer, camera, plant press, thermometer, rain gauge, field guide books for both plants and animals, walkie talkies, voice recorder, meters, etc (Appendix 5) are necessary to conduct the research and monitoring activities mentioned below. Finally, the researched information should be documented and disseminated to all stake holders and for the scientific community.

**Key Targets:**
- ➢ Baseline database of the natural resources and environmental data of the sanctuary collected and become available,
- ➢ Important wildlife habitats, especially for Elephants identified,
- ➢ Status, distribution, behavior, threats and other attributes of Elephants understood,
- ➢ The vegetation and land-use types, and distribution of noxious invasive species within and around BES mapped, and
- ➢ The relationship of local communities and the management of BES is determined for proper intervention measures.

*Operational Objective 2.2 Ensure that all existing facilities, new developments and interventions in BES are subjected to appropriate Environmental Impact Assessments (EIAs)*

In many parts of the world, wildlife and their habitats have diminished with human population growth and the associated developments (Bank *et al*., 2002). It is recognized internationally that developments such as agriculture, transportation and urbanization are affecting the connectivity of wildlife habitats. A good example in Ethiopia could be the situation of Awash NP habitat: loss and fragmentation of habitat and wildlife mortality are evident due to the Addis Ababa-Djibouti highway. Fragmentation of habitat by highways occurs when animals avoid the area of the road, are unable to cross the road, or are killed on the road (Bank *et al*., 2002). Many wild animals are still being killed every day by collision with vehicles on the road passing through an important wildlife habitat which dissected the sanctuary into two.

As explained earlier, developments like biofuel crop production within and around the sanctuary without conducting sound EIA will result in habitat loss which decreases areas that support flora and fauna. One of the consequences of habitat loss is diminishing the connectivity of habitats, which results in fragmentation that limits the natural movement of wildlife to support their life cycle requirements. Consequently, the wild animals in a given area experience physical isolation and eventual extirpation.

The sanctuary should make sure that wildlife corridors should remain large enough in size to support connectivity depending on the behavior of the species. Thus, any developments by the management of the sanctuary such as roads, outposts etc and by other institutions must have EIA to avoid their potential impacts on the Elephant population and the other wild animals. Nationally, important wildlife habitats and corridors should be identified across the country using geographic information system by the federal authority and make available to the investment agency and other development institutions in order to avoid future damages to wildlife habitats. This will give early

warning information to conduct environmental risk assessments to avoid environmentally sensitive projects from such areas.

**Key Targets:**

> ➢ Environmental Impact Assessment protocols prepared,
>
> ➢ The impacts of the existing developments investigated and intervention strategy developed, and
>
> ➢ Policy ideas developed to avoid the impacts of future development on the sanctuary.

*Operational Objective 2.3 Ensure stable and healthy wildlife populations*

The expansion and encroachment of human populations into marginal wildlife areas is increasingly putting Elephants and other wild animals in close contact with people and their livestock. This has led to increased competition between wildlife and livestock, illegal hunting, conflict and disease transmission which contributed to the decline of wildlife (Jacobs and Schloeder, 2001; Muruthi, 2005). Diseases pose threat to people, the food supplies, the economy, and to the biodiversity which is essential to maintain a healthy environment and ecosystem functioning. Many diseases can jump between wild and domestic animals and thereby to the human beings.

As many other PAs in Ethiopia, the wild animals of BES are in close contact with people and their livestock. This will lead to transmission of diseases from domestic to wild animals and vis-a-vis. The rabies case in Bale Mountains NP and that of anthrax in Mago NP which affected so many Ethiopian Wolf and Lesser Kudu, respectively, are the recent phenomena of such livestock-wildlife disease transmission. Similarly, anthrax outbreak in Kenya is one of the major causes of mortality for the endangered Grevy's zebra (Muoria *et al*., 2007). Such kind of situations could have serious impacts at BES where people, livestock and wild animals share critical resources such as water. An integrated approach to human and wildlife health and the environment is necessary to achieve biodiversity conservation objectives (USAID, 2005). Thus, disease surveillance and

monitoring by the sanctuary's veterinary service will give the management the chance to predict and ultimately prevent the potential wildlife disease epidemics. A good understanding of the disease threats and the opportunities of transmissions can lead to more successful biodiversity conservation and human health.

**Key Targets:**
  - ➢ The link between human, domestic and wild animals health is understood and the necessary preparation for control is established,
  - ➢ Communities are aware about the ways of disease transmission and kinds of disease, and
  - ➢ Domestic animals around BES get the common vaccinations.

*Operational Objective 2.4 Improve conservation and management through national and international networking and collaboration*

Currently, the management of PAs needs to involve stakeholders at all levels in the development of policies, regulations, conservation strategies that will create an enabling environment for biodiversity conservation depending on the conditions and peculiarities of the different PAs. It is also necessary to recognize that policies in other sectors, such as investment, land-use, transportation, agriculture, etc., have major effects and implications for the conservation of biodiversity. In addition to the national collaborations with different institutions, international treaties can encourage and motivate national policy development, reform and implementation. Ethiopia is a signatory to many international treaties relevant to biodiversity conservation such as CITES, CBD, the Ramsar Convention, etc. The national policies and the local strategies should support the country's international obligations under the conventions and treaties to which the country is a party.

Thus, Ethiopia needs to have policies, strategies and the accompanying legal instruments to implement these treaties depending on the circumstances. Site activities at BES should be identified in support of specific treaties that the country has signed. The different PAs

of the Range States including BES should implement all the requirements of the Elephant Action Plan (2008) for Elephant conservation and management.

**Key Targets:**

- ➢ Strong cross-sectoral collaboration established with institutions whose activities might have impact on biodiversity conservation,
- ➢ Policy ideas for cross-sectoral collaboration developed, and
- ➢ The requirements of the international treaties relevant to Elephant conservation and the other biodiversity are effectively implemented.

*Strategic Objective 3. Protect the biodiversity resources and ensure the security of BES*

In Ethiopia, wildlife habitat are becoming increasingly degraded, fragmented and in some cases lost entirely due to human-induced threats. In BES, habitat loss and fragmentation due to intensifying human and livestock use and investment are widely recognized as the crucial factor in the declining numbers of large mammal populations, specially the African Elephant. The situation is aggravated by illegal killing of Elephants and other mammals. In 2009, four Elephants were killed for ivory and to protect Elephants from crop damage. Therefore, the initiation of short and long-term management interventions designed to reduce illegal killing of Elephants and alleviate human pressures on BES's habitats are vital for this management plan. This will involve addressing the growing pressures from local residents for the utilization of natural resources therein and law enforcement.

Another crucial issue is to combat illegal killing and trade in wildlife products. This problem will require cooperation with both the local resident communities as well as local government, and will need to receive political backing and policy support both at the regional and federal government levels. Thus, the following operational objectives have been developed to help achieve the strategy.

*Operational Objective 3.1 Conserve the exceptional resource of BES and halt illegal killing of Elephants*

Babile Elephant Sanctuary supports the relic Elephant population, Black-manned Lion and other endangered and migratory bird populations. Loss of Elephant/wildlife habitats as a result of intensifying human and livestock use and illegal killing of Elephants is widely recognized. Babile is recognizing as one of the main route for illegal ivory trade and other wildlife products and poaching is one of the challenges facing the sanctuary. Implementing sound surveillance is important to halt illegal killing of Elephants. Effective protection of Elephants and their habitats will also require new initiatives to meet the resource requirements of local residents by improving the productivity of existing rangelands both outside BES and in CUZ within the boundaries.

**Key Targets:**

➢ Elephants and other mammalian population are stable or increased, through the conservation of their habitat,

➢ The important bird populations of BES and surrounding areas are maintained,

➢ The downstream along the Gobele, Erer, Dakata and Fafum Valleys is conserved, through developing alternative livelihood and sustainable use by local communities,

➢ Sound conservation measures and, where appropriate, sustainable management practices ensured, and

➢ The eastern ivory trade stopped/significantly reduced.

*Operational Objective 3.2 Ensure sustainable use of resource and sound landscape management system*

Local communities from the Oromia and Somali ethnic groups presently occupy 1,507 km$^2$ of the sanctuary's area. Most of the communities have lived within BES for several decades and already established huge settlement and district towns in the Oromia side. Although most of highly settled and cultivated areas are excluded in the revised tentative

boundary in the Oromia side most of the people in the Somali-Babile district are pastoralists and known to encroach into the Elephant range mainly for grazing and scattered settlements are found within the center of the sanctuary but less preferred by Elephants. Within the existing reality, it is impracticable to resettle the people. Therefore, it is essential to implement an integrated landscape management system for component of BES ecosystem functioning.

In order to reconcile the BES's potentially competing conservation and development objectives, this plan advocates the introduction of a comprehensive "landscape" approach to the management of the BES ecosystem, involving the establishment of a zonation designed to accommodate both local community livelihood needs, and the conservation of the BES's exceptional biodiversity resources. This will entail agreeing with the local communities for specific areas of the sanctuary that will be set aside for conservation of exceptional resources, and other areas that will be chiefly utilized, on a sustainable basis, to meet community livelihood needs. Additional areas are also likely to be set aside as "buffer" areas between intensive communities use and conservation such a multiple land-use system. Sound development of this scheme will require extensive consultation and the establishment of joint decision-making forums with the local resident community.

**Key Targets:**

- ➢ Zoning of BES for conservation, development and buffer areas established,
- ➢ Rangeland conditions of the sanctuary and surrounding areas improved, and
- ➢ Encroachment of the core BES area and impact on key wildlife species reduced.

*Strategic Objective 4. Develop both human and physical resources to support viable conservation and management*

The present management system of BES cannot protect the Elephants and other wildlife resource in the sanctuary mainly due to lack of infrastructure, manpower, budget and legal status of the sanctuary's equipment and human resource to run sound management

and patrolling system. Thus, the sanctuary management should have the above mentioned tools to materialize viable conservation and management. Thus, the following operational objectives are the main tools to help achieve the strategy.

*Operational Objective 4.1 Strengthen BES management*

The annual budget for the BES is considerably low (current budget for 2009-10 was 486,392.00 Birr), staff capacity and morale is low, and resources for sanctuary operations are very limited. Although the current scouts are well trained to combat poaching they are few in numbers (27 scouts) distributed into three outposts and not armed with modern automatic rifles and bullets. The outposts are not interconnected with communication, road network and stand by vehicles. The situation is aggravated by the shape of the sanctuary which one could travel over 180 km from the headquarters to patrol some of the pertinent wildlife areas. The result is that the management capacity to actively manage the sanctuary is very limited, leading to low levels of law enforcement and difficulty in dealing with incursions into the strictly-protected core area of the sanctuary.

Poor human and financial resources has also meant that it is difficult to build up the sanctuary's newly-established Community Conservation into a potent force capable of working effectively with the local communities and breaking down the present and conflicts that characterize the relationship between sanctuary management and the communities. However, building strong BES operational capacity goes hand-in-hand with achieving the other strategic management objectives described in this section, all of which are dependent on a strong and empowered BES management team. Finding ways of developing this management capacity will therefore be a vital component in the effectiveness of achieving this MP.

**Key Targets:**

- ➢ Management capacity of BES strengthened,
- ➢ Strong communication established by improving the existing road network and transport system, and
- ➢ Staff moral motivated.

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*Operational Objective 4.2  Strengthen supportive law enforcement*

The success in management of protected areas depends among other things on legal framework and institutional set-up. Accordingly the new wildlife laws and regulation were formulated in-line with the new development initiatives and decentralization policy of the government, which is crucial to give legal bases for some pertinent issues, which were not dealt in the previous proclamations. These include the mandate of the protected areas management and the involvement of local communities and private sector on management of wildlife resources. However, BES is not yet gazetted and has no adopted management plan.

**Key Targets:**

  ➢ Babile Elephant Sanctuary's zonation boundary mapped,
  ➢ Up to date laws and regulations,
  ➢ Bylaws strengthened, management plan developed, and
  ➢ Babile Elephant Sanctuary legally gazetted and boundary description clearly indicated in the Negarit gazetta.

*Operational Objective 4.3 Recruit management staff and capacity building*

As noted earlier, there are only 27 wildlife scouts and not sufficient to undertake effective patrolling activities. At least, ten scouts have to be assigned in each outpost. Accordingly, the total number of scouts should be raised to at least 80, which is indicated in the new manpower of the sanctuary but not recruited, for the time. Furthermore, other technical and supporting staff has not been recruited as per the approved sanctuary manpower structure.

In view of securing the integrity of the sanctuary, the recent Business Process Reengineering (BPR) suggested the hiring of 700 scouts for BES. However, considering the economic situation in Ethiopia, it may not be possible to hire all 700 scouts in the first phase of the MP implementation. It is therefore suggested hiring and training game scouts and professional staff (Appendix 6) at the beginning of the implementation phase. The

remaining manpower would need to be employed subsequently, on a yearly basis, by evaluating the need and the availability of funds assigned for the sanctuary.

**Key Targets:**

> ➢ Additional scouts recruited,
> ➢ Scouts trained in law enforcement and patrol techniques and armed, and
> ➢ Additional supporting and technical staff recruited and trained.

*Operational Objective 4.4 Develop BES's infrastructure for effective management and patrolling*

Infrastructural development includes construction/ renovation of offices, roads, outposts and residence houses, procurement of transport machineries, technical equipments and camping equipments.

*Headquarters and Outposts*: - The sanctuary administration has received a land to build its headquarters in Babile Town. As mentioned under section 8, the HQ at Babile, sub-HQs at Erer and the other outposts at Midega Tola, Ali Ethiopia, Shenile and Fiq should contain the required administrative offices and residential houses. The best sites should be identified during implementation of this management plan in the first two years.

*Roads:* - New roads should be opened to and from outposts and headquarters and construct more networks of roads which take to view points and sites of attraction. Access to the confluence of the Gobele and Erer Rivers, roads parallel to Dakata and Fafum Valleys, and in the long run, a road that encircles the sanctuary is needed. The head quarter should have better and shorter access to nearby districts for sound collaborative work. It is timely to identify additional tourist attraction sites and construct good access and maintain existing tracks.

**Key Targets:**

> ➢ Office and residential houses constructed,
> ➢ Additional four outpost constructed in selected sites,

➢ New roads constructed connecting outposts with the headquarters, and

➢ Materials procured.

***Strategic Objective 5. Mitigate human-wildlife conflict at BES through active stakeholders participation***

As more and more land is taken up for human development, natural areas are destroyed and constricted. Human beings and wildlife naturally come into conflict as a result of resource limitation. In human-wildlife confrontations, humans lose their lives, crops, livestock and other property to wildlife. Wildlife which comes into conflict with human beings is most often already threatened and it happens that they are killed in retaliation for the damage they have incurred. Continuing and unresolved conflict between humans and wildlife should be a key concern for conservationists because it can form a barrier to firm support for conservation from local people. A number of driving forces have been identified as reasons for human-wildlife conflict including land use transformation, species habitat loss, degradation and fragmentation, increased livestock numbers and competitive exclusion of wild herbivores.

Increase of wild population of animals due of conservation effort has also been cited as creating a surplus number of animals that stray too far into human dominated areas. In all cases, the increase of human population is directly related to the aggravation of human-wildlife conflict world-wide. While BES has been recognized as a critical site where there have been negative confrontations between people and Elephants, there are records of Lion and Hyenas depredating on livestock. Measures that would create a lasting solution would be to carry out effective awareness with stakeholders and to create an appreciation of where people understand that wildlife needs a place to live as well. Management measures required include passing on knowledge of preventive measures that will avert conflict before it occurs.

*Operational Objective 5.1 Assess and present a situation analysis of current human-wildlife conflict at BES*

The incidence of human-wildlife conflict at BES is probably one of the highest in the county because of the presence of large mega-herbivores like the Elephants and predators including Lions. Together with this the human population is outstripping the capacity of the land in several areas. This equally means that the status of natural resources has deteriorated immensely. The changes brought by unsustainable use of resources have altered the ideal mutual coexistence between wildlife and human beings. Wildlife which used to rely on the presence of natural prey is resorting to agricultural, human-produced prey. In several instances confrontation with Elephants is dangerous and human lives have been lost in the process. This scenario requires a special study with an emphasis on the negative effects it is causing to human beings. The assessment might require specific studies using a single species approach.

**Key Targets:**

> ➢ A report with an assessment and situation analysis of current human-wildlife conflict at BES produced,
> ➢ Local communities nearby the sanctuary encouraged to cultivate fast growing crops and least preferred/non-palatable by wild animals,
> ➢ Mechanisms to mitigate wildlife/human attacks and crop-raiding incidents identified and quantified, and
> ➢ Communities dwelling adjacent to the sanctuary get trained to avoid Elephant related incidents.

*Operational Objective 5.2 Conduct an awareness campaign that stresses reasons for and alternatives to controlling problem animals*

Most people are unaware that they are living in former wildlife occupied areas. With the advance of human development, wildlife areas have become constrained and their movements have become restrained. Wildlife is at most seen as a threat to lives and an

unwanted risk to development by most people. Wildlife is an important resource and can effectively be used to enhance development and eradicate poverty. Economic, educational, social and scientific values of wildlife can be important contributions to the daily lives of local people in and around BES. To achieve desired goals, local communities have to be aware of the value of wildlife in their lives. The management of BES has to aim to gain the sympathy and good will of people in and around BES. This can be best achieved through protracted awareness campaigns to local people.

**Key Targets:**

➢ Key stakeholders (at the community level) who can gain from awareness campaigns identified,

➢ Awareness raising materials on wildlife value and the need to coexist with people  prepared, and

➢ Awareness campaigns to key communities conducted.

*Operational Objective 5.3 Create a partnership with local communities for solving problem animal control*

Free ranging wildlife utilizes a wide range of habitats for food and cover over time. Their use implies that their movement in space and time is immense. Management of BES is at most ill-equipped and staffed to control most of the sanctuary. The best strategy in this case would be to mobilize the strength and good will of people for co-management of BES. Co-management can be achieved through a guaranteed partnership that values the existence of people. This kind of partnership sees wildlife in their true place without denying the people benefits of protecting them. A partnership is a deal that consists of a series of discussions, debates and trade-offs. Through this kind of partnership there will be roles, responsibilities, losses and gains. In most cases, this kind of contractual setting makes sure that everyone gains something from the venture.

**Key Targets:**

- ➢ Communities participating in human-wildlife conflict avoiding/mitigating strategies at BES, and
- ➢ Human-wildlife conflict mitigated at key sites within and around BES.

**Strategic Objective 6: Develop compatible land use practices within BES**

Conservation of the environment and specifically wildlife management is considered to be an important land use strategy in many countries in the developing world. This strategy opens up proper use of rangelands and areas considered to be marginal for productive use such as arable agriculture. Wildlife conservation and the setting up of protected areas provide an important segment of the country's land use system because it can protect land from abuse and degradation by allowing nature to take its course. Wildlife in many instances are the best form of land use that can also generate income from wildlife watching, sport hunting and non-consumptive use including photography and research. This kind of land use system is also sustainable and humane since it maintains historical harmony between indigenous human populations and wildlife. Abuse and/or misuse of wild lands are experienced largely due to human population and related issues of settlements and food production and intensive development practices. BES is experiencing an expansion of its human population and a number of settlements are growing both inside and on the peripheries of its boundaries. This growing human population relies on the natural resources of the sanctuary for its day to day survival. BES is in a state of flux and the land use practices experienced at the moment are neither compatible nor sustainable. If BES is to continue as a wildlife conservation area, a number of changes are required to help it conserve its nature and wildlife.

*Operational Objective 6.1. Develop a plan that explains current land use practices with reference to current and potential threats*

Since inception, BES has been a favorable ground for human incursion and population growth. The expansive area of the protected area, unavailability of access roads, political

uprisings and conflict has barred its development. If wildlife conservation is to be seen as a viable land use system, there is a need to show its compliance and strengths in view of other dominating land use systems. This can be shown using a proper land use study that depicts current land use systems, their effects on natural systems and their threats to a sustainable form of human livelihoods. A plan that introduces wildlife as a compatible land use system able to conserve natural systems and preserve human lives and dignity is necessary.

**Key Targets:**
- ➢ Current land use practices, their extent and compatibility understood,
- ➢ Value of wildlife conservation as a sustainable land use system valued, appreciated and planned, and
- ➢ A plan describing how wildlife conservation can be an alternative or compatible land use system in the context of current practices engendered.

*Operational Objective 6.2 Produce a zoning plan for the sanctuary allowing areas of strict conservation and multiple-use*

Conservation action at BES in the past has been carried out at large on the basis of "fire fighting" techniques which had a nature of managing crises. An action oriented plan calls for knowing where vital action is required and where we should place less effort. The protected area needs a zoning plan to proportionately apportion time, effort and funds into activities that require priority. Zonation approaches are one of the ways that conservation has adapted from past protectionist approaches allowing use of resources by people in buffer areas. The idea of buffering is not new and it is used widely in various parts of the world for deflecting pressure on core areas by providing for social development in adjacent inhabited areas of a protected area. In this zoning system, an area of strict conservation or core area will be created to cater for resources that require protection. A core area will be rather difficult to define for the Elephant, which is the most important wild animal that thrives at BES. This is mainly due to its movement patterns that involve it to move and use vast amounts of area and habitat.

One of the methods that has been successful in other parts of the world especially in southern Africa, is to delineate and form a migration corridor that allows the Elephants to move unhindered and unthreatened from place to place. This activity (production of a plan) will require the knowledge, partnership and support of wildlife biologists, sanctuary management staff (especially managers and scouts who know the movement patterns, climate and geography of the BES), local communities, local administration, social workers, development agents (DAs) and relevant NGOs in development.

**Key Targets:**

> ➤ A zoning plan that defines strict conservation, multiple-use area including buffer zones developed and produced with the support and participation of all key stakeholders.

*Operational Objective 6.3 Launch habitat connectivity and restoration activities at selected sites in BES*

This objective is an offshoot of the previous operational objective that emphasizes zoning. One of the most important goals in conservation biology is the effort to maintain continuity of populations and ecological processes in the acceleration of habitat destruction, fragmentation and isolation of critical sites. Human-dominated landscapes have been a major barrier and threat to the existence of biodiversity on earth. Recommendations from island biogeography with regards to protected area design have shown that several fragmented landscapes connected by corridors of suitable habitat will have a better chance of surviving as compared to one large area of comparable size to all the fragmented pieces put together. The idea of connecting large-scale habitat values using habitat corridors is valuable and appealing because it is an obvious solution that can link up fragmented wildlife habitat. Its practicality can be difficult owing to local conditions including resistance from local communities and other challenges. Even before this action, historical and current movement of wildlife has to be known or at best surmised from available evidence. The Elephant which requires large tracts of land will inevitably require corridors that extend for hundreds of kilometers. The task of bringing

all stakeholders to an understanding that corridors are necessary and providing for that action will need unwavering commitment from every side. An investigation that tries to find out the cost and benefits of maintaining corridors for wildlife habitat connectivity is timely.

**Key Targets:**

> ➢ Historical and current wildlife movement patterns assessed (qualified) and quantified.
> ➢ A feasibility study that determines the cost and benefit of maintaining wildlife corridors at BES completed.

*Operational Objective 6.4 Create awareness on the need of zoning the BES*

The management of BES would be greatly helped if there is an appreciation of PA zoning by different parties and stakeholders. It goes without saying that all concerned (relevant stakeholders) should participate and accordingly approached. Initial consensus and awareness can smooth the way to the final product. These can be carried out through discussions, seminars or workshops.

**Key Targets:**

> ➢ Awareness campaigns that targets various key stakeholders on the need and value of zoning finalized.

*Operational Objective 6.5 Develop a plan for gazettment of BES*

Gazettment is a means to an end for a protected area and not an end in itself. It can act as an impetus for future achievements in protected area management. It is an important legal action that places can raise the status of a protected area. Gazettment is a legal action that recognizes the status of a protected area nationally. Such legal action also gives the PA

acknowledgement at the regional and international level. It vests administrative powers to managing authorities emanating from the highest legislative authority of the country. Using established norms; gazettment of a PA delimits the boundaries, defines legal and illegal activities and values the presence of the PA as a significant national asset. As this is a matter of policy and legislation, gazettment necessitates the participation of politicians, their constituents, local administration and relevant government bodies. It will involve a series of actions as well as reactions to the proposal. To a large extent, the significance of the site in terms of its achievements and future goals will substantially assist in the final gazettment step.

**Key Targets:**
- ➢ Acceptance level of BES raised through protracted awareness and action at the grassroots,
- ➢ Consensus reached for the gazettment of BES through discussions, seminars and workshops targeting needs, values and benefits to local communities, and
- ➢ Gazettment plan prepared and submitted to government.

*Strategic Objective 7. Increasing protection of migratory corridors and ensure natural habitat connectivity of key wildlife habitat*

Linking important wildlife habitats or areas of high biodiversity has become an increasing priority in the conservation of wildlife habitat. In Ethiopia the widespread conversion of natural habitat into agricultural land and settlement has pushed many species into smaller range and fragments of range land and brought them in direct conflict with humans. The major threat for many species is considered to be habitat loss and fragmentation leaving wildlife to live in a refuge linked by areas under high conservation threat (Harries, 1984). It is recognized that many protected areas are so small to support healthy population of plant and animal species. Thus linking smaller wildlife reserves with similar habitat patches through corridors may alleviate the genetic problems associated with small reserves and allow seasonal movement of species to better resource sites. The rationale for maintaining corridors include increasing immigration rate,

providing movement routes for free ranging species, decreasing inbreeding depression and reducing demographic stochasticity. Thus, establishing corridors across the Gobele, Erer, Dakata and Fafum Valleys and south to Wabi-Shebelle Ecosystem are crucial for linking Elephant and other wildlife habitat. Thus, the following operational objectives have been developed to achieve the strategy.

*Operational Objective 7.1 Establishing Elephant corridors and maintain habitat connectivity*

Elephants used to roam across Fafum, Dakata, Erer and Gobele Valleys and south to Wabi Shebelle catchment and west to Chullul and Ramis Valleys until recent times and data are limited to confidently talk about the current range of Elephants. The protection of all migratory corridors is quite essential especially for the African Elephant. As indicated earlier the African Elephant in BES is known to roam/move across the Erer and Gobele Valleys and known to move considerable distance to north outside the proposed boundary and the other group move towards east up to the Dakata Valley and used to move up to the Fafum Valley. Another movement pattern to the west to Chullul Valley is still maintained by few lone Elephants. However, recent survey indicated that they are more resident within and around the Erer and Gobele Valleys, which indicates that either the migratory routes are blocked by settlements or they migrate probably once in every three or more years depending on changes in factors causing migration. Thus, real causes and routes of migration for Elephants within and outside the sanctuary require further investigations.

The following principle should be adopted in designing wildlife corridors (Harris and Scheck, 1991):

i.  When the movement of individual animals is being considered, when much is known about their behavior, and when the corridor is expected to function in terms of weeks or months then the appropriate corridor width can be measured in meters (1-10m).

ii. When the movement of a species is being considered, when much is known about its biology, and when the corridor is expected to function in terms of years then the corridor width should be measured in 100's of meters (100-1000 m).

iii. When the movement of entire assemblages of species is being considered, and/or when little is known about the biology of the species involved, and/or if the faunal dispersal corridor is expected to function over decades, then the appropriate width must be measured in kilometers.

Therefore, considering the natural movement of Elephants, location and shape of the sanctuary, large corridors are crucial and more than one major wildlife corridors are recommended for BES. The first one could be between the Gobele and Erer Valleys south of Midega Tola Town within the proposed community conservation area. The other corridor of considerable width that would facilitate the west-east movement of Elephants from Erer to Fafum Valleys should be established based on detailed investigation during the implementation of the MP.

Further investigation is needed to maintain the historical movement of Elephants to Chullul Valley to the west and from the Gobele Valley south to the vast Wabi Shebelle Ecosystem. All corridors and Elephant movement routes, watering points have to be clearly identified, demarcated and protected from human interferences such as road construction, cultivation, settlements and grazing. Further, any form of wildlife utilization such as hunting and tourism development should be prohibited in these core Elephant habitats. Access tracks may only traverse wildlife corridors where no reasonable alternative exists.

**Key Targets:**
- ➢ Elephant habitat connectivity between the Erer and Gobele, and Erer and Fafum Valleys secured,
- ➢ Historical routes of Elephants to Chullul Valley and  south to Wabi Shebelle Ecosystem  investigated, and
- ➢ Watershed management improved.

***Strategic Objective 8. Develop efficient mechanisms, which will promote increased stakeholders support***

In Ethiopia, as well as in many other developing countries, protected areas are usually established without giving due consideration to social and cultural impacts they cause on indigenous populations. In many instances, protected areas are established in areas where the local indigenous human population has been living for hundreds if not thousands of years. The action of establishing protected areas without the consent of communities usually creates distrust and resentment to ongoing sanctuary management tasks. Even after establishment, protected area management isolates the surrounding people in spite of the costs incurred on local populations of bearing the survival of the protected area.

The objectives and ideals of traditional PA management require that human influence is minimized or removed if possible. The fact is that in Ethiopia it has been impossible to alienate human populations from protected areas and ways and approaches are needed to reconcile the existence of both. Growing human population requires natural resources for survival and this is one of the primary causes of conflict between local people and sanctuary management. Experience around the world shows that if social and economic objectives are placed in context, both the sanctuary and people can benefit. In this perspective, BES has had historical conflicts between its wildlife and human populations. The sanctuary is one of the most expansive amongst the country's PAs and as a result the jurisdiction of the sanctuary is concentrated in areas where access and security is favorable. The indigenous people would have to see the sanctuary as a benefactor to their survival and livelihood. The management needs to get as much support for the continued existence of the PA from stakeholders.

***Operational Objectives 8.1 Develop a strategy for stakeholder support of BES***

A strategy defines a process for reaching an objective. It is also a scheme that outlines how something can be achieved. Stakeholder support is an extremely complex scenario as it mainly consists of changing behavior and perceptions. While stakeholder support is

an important component for protected area management, as a tool it can take years of hard work with little if any result. BES's management needs to take a crucial step on getting everyone on board from the start. Stakeholder support can only work if there are stakeholders supporting the ideals and existence of BES.

**Key Targets:**

> ➤ A system for stakeholder support defined and in place, and
> ➤ Stakeholders involved and participating in BES conservation ideals.

*Operational Objectives 8.2 Reach an agreement on roles and responsibilities on management objectives and local actions*

Stakeholder support should not only involve passive participation with empty promises. At most it should be a process that provides the capacity for decision making and empowerment. The end result would need some sort of legal agreement or bond between all participating parties showing their roles and responsibilities in the process. Agreements should be binding as they are some form of contract between all people that share a common resource.

**Key Targets:**

> ➤ A binding agreement showing roles and responsibilities of stakeholders at BES in place.

**Strategic Objective 9. Devolution of management, benefits and responsibilities to other relevant institutions for the management of biological diversity, ecological and economic importance**

Traditional protected area management supported attitudes and objectives that went "against the grain" to the needs and aspirations of local communities. These earlier approaches had a philosophy that natural areas had to be kept intact and free from human intervention. All interventions including those meant for subsistence and survival by local

indigenous groups were apprehended. Land on which wildlife lived historically belonged to the surrounding communities. To large extent the costs of keeping nature intact is borne by the locals. Wildlife managers in Ethiopia recall the consequences of depriving local people their natural rights when in 1991 local people destroyed years of conservation work in resentment to heavy handed management in protected areas. While the system of managing sanctuaries and other protected areas is developing in our country, we still lack a system that allows for a strong participatory approach that takes people at the forefront.

A protected area with complex management issues, BES needs to take into consideration the human element as a crucial factor for its existence and survival. The ideal state is a condition where state-run management activities of a protected area including patrolling and sharing of benefits are partially owned or co-managed with local communities. Transfer of authority to the proprietors of natural resources is considered an important step towards achieving conservation goals. Devolution policies are not favorable always. In a number of cases they have not met their goals globally. A number of case studies globally show that there are a number of conditions that need to be considered if devolution of power to local communities is to be effective. First of all there needs to be a consensus on the protection of BES and at the same time recognition of human needs in the area. There needs to be proper and enabling policy and legislation for devolution to take place. Government should also be supervising with capacity building issues including issuance of tenure instruments, strong institutional support, ensuring market access and opportunities.

*Operational Objective 9.1 Execute MoUs with communities and relevant sectors*

Natural resources including wildlife, water, forests, soil and the land in general were originally the home of indigenous communities. These indigenous people have lived with the wild nature for thousands of years and interventions that require management of a single or multiple entities of the natural surroundings should not adversely affect their livelihoods. Minutes of Understanding (MoU) are a means of gaining acquiesce on

management of natural resources in their jurisdiction. The sanctuary has never been able to free itself from domination of local communities even from its inception. This places it in a precarious situation where management programs that are carried out without the consent of locals could be off balance and in the end prove to be its demise. MoU will state the nature of the intervention, benefits and the roles to be played by all the partners involved.

**Key Targets:**

> ➢ Minutes of Understanding that describes intervention, benefits and role of various parties signed by key stakeholders, and
> ➢ Copies of the MoU kept with all participating stakeholders and other copies sent to Regional, Zonal and Woreda Administration/Agricultural offices.

*Operational Objective 9.2 Progressively devolve responsibility for natural resources management to rural communities*

The MoU document should essentially include sections that outline the arrangement of responsibilities and chain of active roles in solving problems associated with degradation and overuse of natural resources. This kind of action may never or could not totally be in the hand of local people. As in several other countries in Africa and Asia, it can ideally be carried out in partnership with government and/or NGOs. But there must be provisions where local people have a vested interest and capacity in running operations concerning their immediate natural environment. This empowerment structure should essentially include their say on what should be done. This program aims to act as a catalyst so that nature and people can coexist without negative impacts of one on another. The program will need to come up with sound alternatives in the form of guidelines that will allow people and wildlife to coexist in the same environment.

**Key Targets:**

> ➢ Provide a procedure (guidelines) for the management of nature and natural resources with local people at the forefront,
> ➢ Identify key problems including incidence and removal of invasive species,

sustainable use of woodland resources, soil and water conservation issues,

➢ Provide specific guidelines for the development and use of identified critical threats/issues to the natural environment,

➢ Set roles and responsibilities to encourage strong partnership among key stakeholders for the management of natural resources.

➢ Develop and carryout effective awareness campaigns that emphasizes the ownership of wildlife and nature to be in the custody of local people.

*Operational Objective 9.3 Assist in building capacity of communities for biodiversity management through Village Elephant Councils*

If communities are to benefit from the use of natural resources and wildlife, capacity building is a requirement that will bring them to the level of understanding involved. Capacity can be defined in various ways but the most important are actual awareness of issues, financial, material and technical. The awareness part can be covered in the previous section but credits and loans, build up of the business of natural resource marketing and technical backup for as long as possible are a requirement if they are to stand on their two feet. Devolution of natural resource management is an effective way of ensuring the conservation of nature and wildlife within local communities. The building of capacity should also go some way to create the sense of empowerment, changing mind sets and belief systems that have been held by the communities for a long time.

**Key Targets:**
➢ Capacity of local people in the area of financial, material and technical needs built, and

➢ Cultivate a lasting partnership with communities through mentoring and technical backup.

*Operational Objective 9.4 Develop framework and guidelines for community based conservation operations*

Community-based conservation of wildlife can be an effective way of protecting key wildlife species and their habitats. This method has worked for many countries but still is experimental in Ethiopia. BES can provide a basis for a community-based conservation project because the need for conserving key species like the Elephant, conflict of interests between humans and wildlife, need for using the conditions for social development and prosperity abound. The problems associated are massive but the process of community involvement in conservation and the way it can fulfill needs can easily be demonstrated in a community that can include a few villages. This stage will assist by developing a framework and guidelines for a productive partnership with communities. While several examples and scenarios can be learnt from other countries, what we see at BES and what we experience in the form of needs of people and wildlife is site specific. The set of issues and their solutions would apply only to BES. As a result, the guidelines that are to be developed would need to deeply appreciate internal and external conditions at BES intimately.

**Key Targets:**
> ➢ Ensure progressive involvement of local communities in biodiversity management of BES, and
> ➢ Develop enabling frameworks, guidelines and policy for community-based Elephant and other wildlife conservation at BES.

*Strategic Objective 10. Improve conservation and management through national and international networking and collaboration*

Environment and related wildlife conservation issues are related to a number of sectoral and cross-sectoral issues including sustainable development, water, energy, gender, education and food security. To be successful, conservation requires strong networking and collaboration at a national, regional and global level. A number of issues relating to legislation, stakeholder involvement, empowerment, species monitoring, capacity

building can be more successful if an approach involving networking and collaboration is effective. Internationally, there are conventions and treaties regarding conservation and regulatory use of ecosystems and species. Signing and enacting these regulations shows responsibility, commitment and respect for nature both at a domestic and global level. Babile Elephant Sanctuary, with its significant population of Elephants and worth nature can benefit in a number of ways by involving widely in national, regional and international collaboration. Networking can be formed with like-minded institutions in the country, region and world to strengthen capacity, knowledge and management effectiveness in the long run.

### *Operational Objectives 10.1 Develop a strategy that defines networking and collaboration needs at a national, regional and global level*

A protected area cannot act as an island devoid of interactions from local and global spheres of influence. While its area can be delimited in space and time, it cannot escape the reality of sharing ecological, social, economic and political aspects at all levels. Management should strive to work towards a goal that places BES in juxtaposition with local, national and regional conditions. While prevailing local and surrounding conditions will affect its interactions strongly, relationships i.e. laws, policies, etc. that are determined at national and international level can affect its survival even more.

**Key Targets:**

> ➢ Have a clear understanding how BES can be affected at local national and global level, and
> ➢ Define human and material capacity for BES that would assist collaboration and networking.

**Strategic Objective 11.  Enhance communication and build image of BES**

The image of conservation areas in general is a reflection of mismanagement and to an extent to conflicts with surrounding indigenous populations. When it comes to conflicts,

not only is the image of a conservation area at risk but its survival as well. Babile Elephant Sanctuary is one of the largest conservation areas in the country but has been invaded by pastoralist communities since historical times.. Human habitation and related activities continue unabated to date. The number of people and villages that have come up within the last two decades, all within the sanctuary, is a sign of failure of management and at the same time a failure of communication and image.

The image of BES is positive in terms of being one of the last refuges for the African Elephant in Ethiopia and most importantly the eastern-most frontier for the world's largest terrestrial mammal in Africa. On the other hand, BES is also beleaguered by a multitude set of anthropogenic factors that have not had lasting solutions despite varying amount of management by an overwhelmed staff. Communication can be used as a tool to bring out a positive change in image of an institution. As a result, BES needs to develop strategies of developing staff capacity in communicating realistic options and goals to bring about a positive and lasting image.

*Operational Objectives 11.1 Carry out timed and appropriate awareness creation programs to public to develop image of BES*

Babile Elephant Sanctuary requires repetitive, motivating and lasting awareness programs to all levels of the public. A large part of this should target the local populace and regional set up. Politicians, administrators, farmers and students and other audience require targeted programs on wildlife conservation and the need for BES as a protected area.

**Key Targets:**

➢ Targeted awareness programs to various levels of society prepared, and
➢ Awareness programs to various levels of society implemented.

**Strategic Objective 12. Establish and develop tourism management system for BES and local community**

Tourism improves the quality of life of the local communities residing around national parks or sanctuaries or any other protected areas. It also creates potential for innovations. At local level, tourism stimulates profitable domestic industries, hotels, restaurants, transport systems, souvenirs, and handcraft and guide services. Therefore, the sanctuary office in cooperation with other concerned institutions has to organize and establish a proper management program, which will lead towards the use of the sanctuary's spectacular for visitors.

The tourism management is crucial to:

- generate incomes from tourism related activities,
- contribute towards the improvement of the socio-economic life of the local communities,
- provide visitors with a suitable standard of tourism services in the area,
- identify/arrange possibilities of attracting both local and international tourists, and
- Encourage the private sectors to participate in tourism development.

The suitability of certain area for tourism depends among others on the existence of tourist attractions and availability of infrastructural facility. The operational objective to achieve the above stated strategic objectives would contain the following major components:

***Operational Objective 12.1 Develop tourist facilities and raise income from wildlife tourism***

The major components that need due attention for sound tourism management includes identification of recreation sites, establishing good tourist information system, wildlife viewing sites, nature trail, good road network, hotels and safety of tourists.

***Recreation*:** Attempts need to be made so that tourists who want to put their time and money to good use are guaranteed to better sightseeing and reception.  At the present, the BES does not own essential facilities and infrastructure that enhance tourists' happiness. Tourists will be delighted if there are campsite viewpoints and bird watching blinds. Reception of tourists should be handled carefully in such a way that there should not be any complaints arising from tourists.

It will be essential also to establish and promote the current standard of the local handicraft industry, which offers limited number of artifacts such as small baskets, shield, etc.  Training programs need to be arranged for the community around the sanctuary so that traditional skills of the people in handcraft are upgraded thereby eventually offering a variety of artifacts to the tourist. Thus, the following operational objectives are developed to help sound tourism development in BES.

***Develop information center and sign boards*:** An information center is useful for providing basic data on the sanctuary and the surrounding community.  At the entrance gate there need to be a museum which consists of maps of the sanctuary, explanatory diagrams, pictorial charts, study collections, collection of the main interesting animals and plants, fossils, geological specimens and diagrams. It is also helpful to have a meteorological chart, and historical, archaeological and ethnological material.

***Wildlife viewing*:** the construction of a lookout tower that enables tourists to have a good view of the wildlife and vegetation of the sanctuary.  Wildlife view sites should be established on the vantage points on the top of the Erer and Gobele Valleys. A lookout tower is important for all outposts and should be constructed at a strategic place to facilitate observation especially if it does not exist naturally nearby outposts. Additional lookout tower should be installed near areas with a concentration of animals such as watering point, wildlife corridors, poaching sites and good scenery like sites at the confluence of major rivers. Lookout tower is especially useful for the wildlife professionals/researchers who want to have a deeper insight into the wealth of the sanctuary.

*Nature trails:* Babile Elephant Sanctuary does not have well established nature trails. It is essential to have paths and trails for those interested in walking through the sanctuary in order to do the daily exercise and have fun besides being able to watch the wildlife closely. However, care should be taken to avoid known sites with dangerous wild animals. Trained local guides should provide guiding services to tourists.

*Safety of visitors***: -** Mass tourism at this stage of PA development at BES could have repercussions on the flow and management of tourism in the area. Security in the area needs to be ensured and tourism cannot exist without peaceful environment. Safety of visitors can be assured by providing long-lasting and reliable security through conflict resolution mechanisms. Federal as well as regional government administrative bodies would need to take the forefront in establishing mechanisms for viable tourism development of which tranquil situations are precedents.

*Accommodation***:** At present, the sanctuary has no lodges and well equipped camping sites with the required facilities. In addition to the ones present at Harer, additional tourist accommodation needs to be built at strategic places in larger towns around the BES. As regards to infrastructure for lodging in the sanctuary, tented camps may be preferable to other permanent buildings. However, lodge sites should be identified and developed on the basis of a nature (eco) friendly principle.

**Key Targets**
> ➢ Recreation sites identified and established,
> ➢ Wildlife viewing sites identified and lookout towers constructed,
> ➢ Safety of tourists guaranteed, and
> ➢ Tourist accommodations improved.

*Operational Objective 12.2 Develop, manage and sell tourist products*

Tourism is a significant market for developing countries and one of the top hard currency earners for a country. In many respects, the value of tourism to local economies has steadily grown as communication and travel continue to develop around the world. As of

recent, tourism has taken a new dimension of responsible tourism by developing nature-friendly, indigenous population respecting ecotourism movement. This movement, though seen to be not more than a marketing tool by some, has changed the thinking of all involved including the tourist, local governments and local people where the activities take place. Ethiopia is a late comer into the tourism industry but arguably has had sufficient time to develop potential in this kind of venture. To a large extent and sadly this is not what we see today.

Ethiopian NPs and other conservation areas, amongst other aspirations, were established on the premises of generating income from tourism. Tourism is an industry and as an industry it requires time, finances and plans to develop and implement. Ethiopian conservation areas can gain from proper ecotourism plans that are integrated into Federal and Regional development plans. Babile Elephant Sanctuary is a valuable conservation area that has strong potentials for generating income from tourism. Tourism at BES can be successful if it is developed and properly managed to generate income. Development implies stakeholder participation, consultative planning, balanced nature-people programs, technically acceptable designs and flawless construction. Management implies day to day administration but also strongly means partnerships and understanding between all relevant partners and the local community. Selling tourism products calls for effective marketing strategies. One of the ways of doing this is to provide outlets at various sites (on-site and off-site) for the sale of tourism products including cultural commodities and produced promotion materials. Promote BES both locally and internationally using various media and communication strategies including websites.

**Key Targets:**
- Identify key tourism products at BES,
- Employ staff that will be responsible for developing and managing tourism at BES,
- Put in place ways in which local communities can produce and provide cultural products for tourist market at BES,
- Produce printed material showing tourist attractions and promote BES's role

as a tourism destination,

➢ On-site and off-site outlets for the sale of tourism products in place, and

➢ Promote BES using various media including electronic means (website).

## 9.2 Activities and Indicators

| Operational Objectives | Activities | Indicators |
|---|---|---|
| **Strategic Objective 1. Conserve biodiversity and maintain ecological integrity** | | |
| 1.1 Conservation and ecological status of BES: key targets enhanced and threats reduced | • Prioritize critical habitats and core areas for protection against deforestation and fire | • Size and fragmentation of prioritized areas (both protected and unprotected) identified |
| | • Identify and preserve adequate areas of dry season water points and forage | • Number and size of water points and forage areas identified and preserved |
| | • Assess the present distribution and status of African Elephant and other endangered mammalian species | • Number of aerial and ground census conducted |
| | • Strengthen efforts to reduce threats to African Elephants | • % reduction in poaching and in rate of disturbances in Elephant habitats |
| | • Undertake assessments and monitoring to understand human effects on key parameters of rivers and water catchments such as water flow, water quality and water extraction | • Increase in flow rates, decrease in water extraction levels, dissolved oxygen, PH, level of salinity, water clarity or turbidity, temperature, etc |
| | • Raise awareness and advocate issues affecting the riverine system and water catchments | • Number of awareness programs and advocates undertaken |
| | • Establish stakeholder collaboration and partnerships to sustainably manage rivers, water catchments and endangered species | • Workshops and meetings conducted, committee established |
| | • Conduct research to better understand the migration movements, population dynamics and disease prevalence of Elephants | • Number of research documents and assessments conducted |

| Operational Objectives | Activities | Indicators |
|---|---|---|
|  | • Conduct sound law enforcement to protect Elephants from poaching and human encroachments | • % reduction in human - livestock population pressure and % reduction in extent of cultivation near Elephant migratory routes |
|  | • Advocate and collaborate with partners for the protection of Elephant migration routes in BES and surroundings | • Number of meetings and workshops conducted, and committee established |
| 1.2 Regular monitoring and assessment of key ecosystem values and ecological processes strengthened | • Undertake assessments of biodiversity resources and key ecological functions | • Number of surveys and assessments |
|  | • Analyze and interpret satellite images, aerial photos and ground surveys to understand key ecological functions | • Research documents and reports compiled |
|  | • Develop framework to sustainably monitor and manage ecological processes | • Framework developed |
| 1.3 Develop and implement viable and sustainable area management programs in biodiversity conservation and ecosystem management | • Prepare Elephant management site action plan | • Elephant site action plan prepared |
|  | • Identify levels and kinds of land use within the watersheds of BES | • Watershed site action plan developed |
|  | • Develop watershed management site plan | • Number of land use types identified and documented |
|  | • Prepare fire management plan | • Fire management plan in place |
|  | • Design strategy and prepare a Community Based Ecological Monitoring (CBEM) Plan | • CBEM plan strategy designed and in place |
|  | • Implement CBEM Plan | • CBEM plan implemented |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| **Strategic Objective 2. Conduct biodiversity research and monitoring at BES** | | |
| 2.1 Carry out detailed research, monitoring, inventories and regular surveys in BES | • Undertake detailed inventories and surveys on biodiversity potential of BES<br>　▪ Aerial survey for Elephants and other big wild animals<br>　▪ Ground survey for all wild animals (mammals, birds, reptiles, etc) and document habitat types for each species<br>　▪ Collection and identification of plant species within the sanctuary<br>　▪ Establishment of Herbarium<br>　▪ Establishment of Museum with specimens found killed with car along streets or from the remains killed by carnivores or disease | • No. of surveys conducted<br><br>• No. of surveys conducted<br><br><br>• Checklist of wild animals prepared<br>• Checklist of plants for BES prepared<br><br>• Herbarium and museum established |
| | • Identify core wildlife areas for the keystone species | • Core wildlife areas identified |
| | • Map the vegetation types of the study area using satellite image and ground truthing | • Vegetation map produced |
| | • Determine factors affecting the Elephant population abundance and distribution | • Threats to Elephants identified |
| | • Investigate the influence of Elephants on the abundance and distribution of other wild herbivores in-terms of Elephant induced vegetation changes | • Influence of Elephants on biodiversity determined |
| | • Continue to investigate the spatial and temporal movements of Elephants | • Resource use patterns of Elephants determined |
| | • Undertake thorough behavioral ecology studies on Elephants | • Man-hours in the field, study reports on Elephant behavioral ecology |
| | • Determine the relationship of local communities with the management of BES | • Attitudes of local communities determined |
| | • Map land-use and land-cover patterns of the weredas within and adjoining the sanctuary | • Land-use and land cover types mapped |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| | • Map the distribution of invasive species such as *P. juliflora, P. hysterophorus, L. camara*, etc | • Distribution of invasive species mapped |
| | • Collect environmental data | • Environmental data available |
| | • Develop EIA protocols for collecting pertinent data | • EIA protocol prepared |
| | • Conduct EIAs for all major development activities within BES | • No. of EIAs conducted |
| | • Identify the impact of the existing developments on biodiversity resources of BES | • Existing developments on biodiversity identified |
| | • Design intervention strategy | • Interventions undertaken |
| | • Prepare policy idea to avoid/minimize the impacts of developments to wildlife and their habitats in the future | • Policy idea on mitigation developed |
| 2.3. Ensure stable and healthy wildlife populations | • Conduct systematic disease surveillance and control | • No. of surveillance conducted |
| | • Carry out immediate action to any carcasses of wild animals to minimize the probability of disease transmission burning, burying, etc) | • No. of disease control activities |
| | • Form collaboration with government offices and local people to make sure that the domestic animals in the area are vaccinated to prevent disease transmission (collaboration with the veterinary services in the area) | • No. of domestic animals vaccinated periodically |
| | • Raise awareness and educate the local communities about zoonotic diseases | • No. of awareness creation programs |
| 2.4. Improve conservation and management through national and | • Establish cross-sectoral collaborations with institutions whose activities might have impact on biodiversity conservation | • No. of cross-sectoral collaborations and agreement |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| international networking and collaboration | • Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation i.e. CBD, SSC, WCI, CITES, CMS, Ramsar, etc | • No. of international linkages established |
| | • Record the illegal killings of Elephants under the frame work of Monitoring the Illegal Killing of Elephants (MIKE) | • No. of documents compiled |
| **Strategic Objective 3. Protect the biodiversity resources and ensure the security of BES** | | |
| 3.1. Conserve the exceptional resource of BES and halt illegal killing of Elephants | • Asses surveillance capacities | • Gaps identified |
| | • Recruit and train scouts | • No. of scouts recruited and trained |
| | • Conduct systematic surveillances | • No of man hours patrolled and ivories seized |
| | • Combat illegal trade in ivory | • % reduction in poaching incidents |
| | • Work closely with police and checkpoint workers | • No. of workshops conducted and committee established |
| | • Campaign law enforcement awareness program to various stakeholders such as judiciary, policy and the community | • No. of awareness creation programs<br>• No. of brochures related to law enforcement prepared and disseminated |
| 3. 2. Ensure sustainable use of resource and sound landscape management system | • Identify threats to wildlife resources | • No. of threats identified |
| | • Identify sites for wildlife and human use | • Potential sites identified, types of PAS established |
| | • Conduct forums with stakeholders | • No. of forums conducted |
| | • Discuss and agree on various land use options | • No of agreements reached |
| | • Develop bylaws on resource management | • No. of bylaws developed |
| | • Establish Community Based Organization (CBOs) | • No. of CBOs established |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| **Strategic Objective 4. Develop both human and physical resources to support viable conservation and management** | | |
| 4.1 Strengthen BES management function | • Review the existing organizational and administrative structure | • Revised structure in place |
| | • Manpower development and planning | • No of trained staff and planned doc |
| | • Provision of welfare facilities | • Availability of facilities – medical |
| | • Provision of space, working tools, and equipments | • No of materials and facilities |
| | • Create conducive environment and safety at work | • Safety protocol prepared and training provided |
| 4.2 Strengthen supportive law enforcement | • Identify gaps in law enforcement | • No. of gaps identified |
| | • Erect boundary beacons on Somali side of the BES | • Boundary beacons in place |
| | • Develop a zonation map for BES | • No. of maps produced |
| | • Gazette the sanctuary to a NP status | • Negarit gazetta |
| 4.3 Recruit management staff and capacity building | • Identify gaps in manpower | • No of gaps identified |
| | • Recruit scouts and other staff | • No of staff recruited |
| | • Train staff | • No of trained staff |
| | • Identify sites for office and outposts construction | • No. of sites constructed |
| | • Construct new office, outposts and staff houses | • No of office and outposts constructed |
| | • Construct new roads | • New roads constructed in km |
| | • Maintain all roads used for management and patrolling | • Road maintained in km |
| | • Procure field material for surveillance | • No. of materials procured |
| **Strategic Objective 5. Mitigate human-wildlife conflict at BES through active stakeholder participation** | | |
| 5.1 Assess and present a situation analysis of current human-wildlife | • Identify key human-wildlife conflict zones within and around BES | • Document describing conflict zones |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| conflict at BES | • Complete a situation analysis showing incidences, costs and socio-economic implications | • A situational analysis study on incidence, costs and socio-economic implications |
| | • Hold awareness workshops/meetings for stakeholders at Woreda and Zone | • Number of workshops/meetings organized |
| 5.2 Conduct an awareness campaign that stresses reasons for and alternatives to controlling problem animals | • Carry out an awareness raising campaign on alternatives on controlling problem animals | • Report on awareness raising campaign |
| 5.3 Create a partnership with local communities for solving problem animal control | • Establish a conflict resolution committee composed of various stakeholders | • Conflict resolution committee established from Oromia and Somali communities |
| **Strategic Objective 6: Develop compatible land use practices within BES** | | |
| 6.1 Develop a plan that explains current land use practices with reference to current and potential threats | • Develop a plan that describes current land use at BES | • Land use plan developed and in place |
| 6.2 Produce a zoning plan for the sanctuary allowing areas of strict conservation and multiple-use | • Develop a zoning plan for BES showing areas of strict conservation and multiple-use | • Zoning plan developed and in place |
| 6.3 Launch habitat connectivity and restoration activities at selected sites in BES | • Carry out detailed study on habitat connectivity and habitat restoration at selected sites in BES | • No. of studies on habitat connectivity and restoration |
| 6.4 Create awareness on the need of zoning the BES | • Carry out awareness programmes on zoning at BES | • No of awareness programmes |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| 6.5 Develop a plan for gazettment of BES | • Develop a strategy and gazettment plan for BES | • Strategy and plan for gazettment prepared |
| **Strategic objective 7. Increase protection of migratory corridors and ensure natural habitat connectivity of key wildlife habitat** | | |
| 7.1 Establishing Elephant corridors and maintain habitat connectivity | • Identify wildlife corridor | • No. and area of corridors identified |
| | • Rehabilitate wildlife corridors | • Area of cultivate sites rehabilitated |
| | • Free the corridor from adverse human activities | • No. of people resettled |
| | • Protect the corridors for free wildlife movement | • No. of patrol days |
| | • Ensure free wildlife movement between valleys | • No. of Elephant corridors secured |
| **Strategic Objective 8. Develop efficient mechanisms, which will promote increased stakeholder support** | | |
| 8.1 Develop a strategy for stakeholder support of BES | • Identify key stakeholders in and around BES | • No. of key stakeholder groups identify |
| | • Mobilise and sensitize stakeholders (propaganda) on their positive support for BES | • No. of sensitization/mobilization programmes |
| | • Identify conflicting needs on the resources of BES with stakeholders | • Conflicting needs of stakeholders identified and documented |
| | • Developing a common objective that serves both the BES and its stakeholders | • Common objective of BES and stakeholders identified |
| | • Establish short, medium and long term objectives that require implementation | • Short medium and long-term objectives established |
| 8.2 Reach an agreement on roles and responsibilities on management objectives and local actions | • In participation with relevant stakeholders, develop an agreement on roles and responsibilities | • Agreement describing roles and responsibilities developed and in place |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| **Strategic Objective 9. Devolution of management, benefits and responsibilities to other relevant institutions for the management of biological diversity, ecological and economic importance** | | |
| 9.1 Execute MoUs with communities and relevant sectors | • Identify communities and stakeholders for authority transfer | • Relevant and key communities and stakeholders identified |
| | • Hold mobilization meetings with stakeholders at key sites | • No of mobilisation meetings conducted for stakeholders at key sites |
| | • Conduct signing of MoU's that identify roles and responsibilities with communities | • No. MoU's signed by community representatives |
| 9.2 Progressively devolve responsibility for natural resources management to rural communities fairly | • Hold discussions about problem animal control and alternative control measures with relevant communities | • No. of discussions on problem animal control |
| | • Develop modalities for progressive devolvement and co-partnership in problem animal control | • Participatory modality guidelines developed for problem animal control |
| 9.3 Assist in building capacity of communities for biodiversity management through village Elephant councils | • Mobilise communities and create "*village Elephant councils*" that would play a vanguard role in Elephant protection | • Nos. of communities mobilized |
| | • Develop roles and modalities for village Elephant councils to be realized as local associations | • Council roles and responsibilities developed |
| | • Identify communal areas where human-Elephant conflict is most common | • Communal areas with human-Elephant conflict identified and documented |
| | • Identify community leaders and elders who have influence within human-Elephant conflict zones | • Nos. of community leaders identified |
| | • Work with the community leaders to select members of the council (chair, vice-chair, secretary and treasurer) | • Members of council elected and in place |
| 9.4 Develop framework and guidelines for community based conservation operations | • Framework for community based conservation operations developed in participation with communities | • Framework developed and in place |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| | | |
| **Strategic Objective 10. Improve conservation and management through National and International networking and collaboration** | | |
| 10.1 Develop a strategy that defines networking and collaboration needs at a national, regional and global level | • Develop a strategy that defines networking and collaboration at all levels | • Strategy on networking and collaboration developed and in place |
| | • Establish cross-sectoral collaborations with institutions whose activities might have impact on biodiversity conservation | • No. of cross-sectoral collaborations and agreements established |
| | • Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation | • No. of documents compiled |
| **Strategic Objective 11  Enhance communication and image of BES** | | |
| 11.1 Carry out timed and appropriate awareness creation programmes to public to develop image of BES | • Develop awareness programmes for schools, admin bodies, farmers and pastoralists | • No. of awareness programmes for various audiences |
| **Strategic Objective 12. Establish and develop tourism management system for BES and local community** | | |
| 12.1 Develop tourist facilities and raise income from wildlife tourism | • Identification of sites for lodge and camping | • No. of sites identified |
| | • Develop tourism development plan | • Tourism plan developed and in place |
| | • Establish lodges and camp sites | • No. of  private investors invited |
| | • Secure safety of tourist | • No. of scouts escorting tourists |
| | • Identify wildlife viewing sites | • No. of viewpoints established |
| | • Establish lookout towers | • No. of lookout towers established |
| | • Develop income from tourism | • Total annual income generated from tourism |
| | • Involve local communities in tourism | • No. of local tourists |
| | • Identify and minimize impacts on scenic resources of importance | • No. of attraction sites protected |

| Operational Objectives | Activities | Indicators |
|---|---|---|
| 12.2 Develop, manage and sell tourist products | • Identify tourism products at BES | • Numbers and types of tourist products |
| | • Carry out a tourism feasibility study at BES | • Feasibility report |
| | • Identify stakeholders in tourism at BES | • List of identified stakeholders |
| | • Develop a partnership action plan that considers all key stakeholders at BES | • Documented action plan |
| | • Sensitize/mobilize community in the values and benefits of tourism | • Report showing number of communities mobilized |
| | • Carry out an environmental impact assessment with a focus on tourism at BES | • EIA document |
| | • Formalize partnerships and legal requirements on tourism at BES | • Legal partnership document |
| | • Implement and mobilize resources for tourism development at BES | • Documents showing resources and funds deployed |
| | • Develop a marketing strategy for BES | • Document describing marketing strategy |
| | • Establish cooperatives from communities to sell their traditional/cultural products | • Number of cooperatives established |
| | • Train members of cooperatives to produce quality cultural products | • Number of cooperatives trained |
| | • Train community tourist guides with appropriate guidelines | • Number of community tourist guides trained<br>• Guidelines prepared |
| | • Training of communities in sustainable resources use | • Number of training held |

## 9.3 Time of Implementation

| Operational objectives | Activities | Ethiopian Budget Year | | | | |
|---|---|---|---|---|---|---|
| | | *2011* | *2012* | *2013* | *2014* | *2015* |
| *Strategic objective 1. Conserve biodiversity and maintain ecological processes* | | | | | | |
| 1.1 Conservation and ecological status of BES key targets enhanced and threats reduced | • Prioritize critical habitats and core areas for protection against deforestation and fire | X | | | | |
| | • Identify and preserve adequate areas of dry season water points and forage | X | X | X | X | X |
| | • Assess the present distribution and status of African Elephant and other endangered mammalian species | X | X | X | X | X |
| | • Strengthen efforts to reduce threats to African Elephants | X | X | X | X | X |
| | • Undertake assessments and monitoring to understand human effects on key parameters of rivers and water catchments such as water flow, water quality and water extraction | X | X | X | X | X |
| | • Raise awareness and advocate on issues affecting the riverine system and water catchments | X | X | X | X | X |
| | • Establish stakeholder collaboration and partnerships to sustainably manage rivers, water catchments and endangered species | X | X | | | |
| | • Conduct research to better understand the migration movements, population dynamics, and disease prevalence of Elephants | X | X | X | X | X |
| | • Conduct sound law enforcement to protect Elephants from poaching and human encroachments | X | X | X | X | X |
| | • Advocate and collaborate with partners for the protection of Elephant migration routes in BES and surroundings | X | X | X | X | X |

| Operational objectives | Activities | Ethiopian Budget Year | | | | |
|---|---|---|---|---|---|---|
| | | *2011* | *2012* | *2013* | *2014* | *2015* |
| 1.2 Regular monitoring and assessment of key ecosystem values and ecological processes strengthened | • Undertake assessments of biodiversity resources and key ecological functions | x | x | x | x | x |
| | • Analyze and interpret satellite images, aerial photos and ground surveys to understand key ecological functions | x | x | | | x |
| | • Develop framework to sustainably monitor and manage ecological processes | x | | | | |
| 1.3 Develop and implement viable and sustainable area management programs | • Prepare Elephant management site action plan | | | | | x |
| | • Identify levels and kinds of land use within the watersheds of BES | | x | | | |
| | • Develop watershed management program | | | x | | |
| | • Prepare fire management plan | | | | x | |
| | • Design strategy and prepare a CBEM Plan | x | x | | | |
| | • Implement CBEM Plan | x | x | x | x | x |
| *Strategic Objective 2. Conduct biodiversity research and monitoring at BES* | | | | | | |
| 2.1 Carry out detailed research, monitoring, inventories and regular surveys in BES | • Undertake detailed inventories and surveys on biodiversity potential of BES | x | x | | | |
| | • Identify core wildlife areas for the keystone species | x | | | | |
| | • Map the vegetation types of the study area using satellite image and ground truthing | | | x | | |
| | • Determine factors affecting the Elephant population abundance and distribution | | x | | | |
| | • Examine the genetic distinctiveness of the population of Elephants in Babile from the other African Elephants | | | x | | |
| | • Investigate the influence of Elephants on the abundance and distribution of other wild herbivores | | | x | | |

| Operational objectives | Activities | Ethiopian Budget Year | | | | |
|---|---|---|---|---|---|---|
| | | *2011* | *2012* | *2013* | *2014* | *2015* |
| | in-terms of Elephant induced vegetation changes | | | | | |
| | • Investigate the spatial and temporal movements of Elephants | x | x | x | x | x |
| | • Undertake thorough behavioral ecology studies on Elephants | x | x | x | x | x |
| | • Determine the relationship of local communities with the management of BES | x | x | | | |
| | • Map land-use and land-cover patterns of the weredas within and adjoining the sanctuary | | x | | | |
| | • Map the distribution of invasive species such as *P. juliflora, P. hysterophorus, L. camara*, etc | | x | | | |
| | • Collect environmental data | x | x | x | x | x |
| 2.2 Ensure that all existing facilities, new developments and interventions in BES are subjected to appropriate EIAs | • Develop EIA protocols for collecting pertinent data | x | | | | |
| | • Conduct EIAs for all major development activities within BES | x | x | | | |
| | • Identify the impact of the existing developments on biodiversity resources of BES | x | x | | | |
| | • Design intervention strategy | | x | | | |
| | • Prepare policy idea to avoid/minimize the impacts of developments to wildlife and their habitats in the future | | x | | | |
| 2.3. Ensure stable and healthy wildlife populations | • Conduct systematic disease surveillance and control | x | x | x | x | x |
| | • Carry out immediate action to any carcasses of wild animals to minimize the probability of disease transmission burning, burying, etc) | x | x | x | x | x |
| | • Form collaboration with government offices and local people to make sure that the domestic animals in the area are vaccinated to prevent disease transmission (collaboration with the veterinary | x | x | x | x | x |

| Operational objectives | Activities | Ethiopian Budget Year | | | | |
|---|---|---|---|---|---|---|
| | | *2011* | *2012* | *2013* | *2014* | *2015* |
| | services in the area) | | | | | |
| | • Raise awareness and educate the local communities about zoonotic diseases | x | x | x | x | x |
| 2.4. Improve conservation and management through national and international networking and collaboration | • Establish cross-sectoral collaborations with institutions whose activities might have impact on biodiversity conservation | x | x | x | x | x |
| | • Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation i.e. CBD, SSC, WCI, CITES, CMS, Ramsar, etc | x | x | x | x | x |
| | • Record the illegal killings of Elephants under the frame work of MIKE | x | x | x | x | x |
| Strategic Objective 3. Protect the biodiversity resources and ensure the security of BES | | | | | | |
| 3.1. Conserve the exceptional resource of BES and halt illegal killing of Elephants | • Asses surveillance capacities | x | | | | |
| | • Recruit and train scouts | x | | | | |
| | • Conduct systematic surveillances | x | x | x | x | x |
| | • Combat illegal trade in ivory | x | x | x | x | x |
| | • Work closely with police and checkpoint workers | x | x | x | x | x |
| | • Campaign law enforcement awareness program to various stakeholders such as judiciary, policy and the community | x | x | x | x | x |
| 3.2. Ensure sustainable use of resource and sound landscape management system | • Identify threats to wildlife resources | x | | | | |
| | • Identify sites for wildlife and human use | x | | | | |
| | • Conduct forums with stakeholders | x | x | x | x | x |
| | • Discuss and agree on various land use options | x | x | | | |
| | • Develop bylaws on resource management | | x | | | |
| | • Establish CBOs | x | | | | |

| Operational objectives | Activities | Ethiopian Budget Year | | | | |
|---|---|---|---|---|---|---|
| | | *2011* | *2012* | *2013* | *2014* | *2015* |
| *Strategic Objective 4. Develop both human and physical resources to support viable conservation and management* | | | | | | |
| 4.1 Strengthen BES management function | • Review the existing organizational and administrative structure to develop an appropriate and effective structure | x | | | | |
| | • Manpower development and planning | x | | | | |
| | • Provision of welfare facilities | x | | | | |
| | • Provision of space, working tools, equipments | x | x | | | |
| | • Create conducive environment and safety at work | x | x | | | |
| 4.2 Strengthen supportive law enforcement | • Identify gaps in law enforcement | x | | | | |
| | • Demarcate the boundary BES | x | x | | | |
| | • Develop a zonation map for BES | x | | | | |
| | • Gazette the sanctuary to a NP status | | x | | | |
| 4.3 Recruit Management staff and capacity building | • Identify gaps in manpower | x | | | | |
| | • Recruit scouts and other staff | x | x | | | |
| | • Train staff | x | x | x | x | x |
| | • Identify sites for office and outposts construction | x | | | | |
| | • Construct new office, outposts and staff houses | x | x | x | | |
| | • Construct new roads | x | x | x | x | x |
| | • Maintain all roads used for management and patrolling | x | x | x | x | x |
| | • Procure field material for surveillance | x | x | x | x | x |

| Strategic Objective 5. Mitigate human-wildlife conflict at BES through active stakeholder participation | | | | | | |
|---|---|---|---|---|---|---|
| 5.1 Assess and present a situation analysis of current human-wildlife conflict at BES | • Identify key human-wildlife conflict zones within and around BES | X | X | | | |
| | • Complete a situation analysis showing incidences, costs and socio-economic implications | X | X | | | |
| | • Hold awareness raising workshops/meetings for stakeholders at Woreda and Zone | X | X | X | X | X |
| 5.2 Conduct an awareness campaign on controlling problem animals | • Carry out an awareness raising campaign on alternatives on controlling problem animals | X | X | X | X | X |
| 5.3 Create a partnership with local communities for solving problem animal control | • Create a partnership with local communities for solving problem animal control | X | X | X | X | X |
| Strategic Objective 6: Develop compatible land use practices within BES | | | | | | |
| 6.1 Develop a plan that explains current land use practices with reference to current and potential threats | • Develop a plan that describes current land use at BES | X | X | | | |
| 6.2 Produce a zoning plan for the Sanctuary allowing areas of strict conservation and multiple-use | • Develop a zoning plan for BES showing areas of strict conservation and multiple-use | X | | | | |
| 6.3 Launch habitat connectivity and restoration activities at selected sites in BES | • Carry out detailed study on habitat connectivity and habitat restoration at selected sites in BES | X | X | | | |
| 6.4 Create awareness on the need of | • Carry out awareness programmes on zoning at BES | X | X | | | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| zoning the BES | | | | | | |
| 6.5 Develop a plan for gazettment of BES | • Develop a strategy and gazettment plan for BES | X | X | | | |
| **Strategic objective 7. Increase protection of migratory corridors and ensure natural habitat connectivity of key wildlife habitat** | | | | | | |
| 7.1 Establishing Elephant corridors and maintain habitat connectivity | • Identify wildlife corridor | X | | | | |
| | • Rehabilitate wildlife corridors | | X | X | X | X |
| | • Free the corridor from adverse human activities | | X | X | | |
| | • Protect the corridors for free wildlife movement | X | X | X | X | X |
| | • Ensure free wildlife movement between valleys | X | X | X | X | X |
| **Strategic Objective 8. Develop efficient mechanisms, which will promote increased stakeholder support** | | | | | | |
| 8.1 Develop a strategy for stakeholder support of BES | • Identify key stakeholders in and around BES | X | | | | |
| | • Mobilize and sensitize stakeholders (propaganda) on their positive support for BES | X | X | X | X | X |
| | • Identify conflicting needs on the resources of BES with stakeholders | X | X | | | |
| | • Developing a common objective that serves both the BES and its stakeholders | | X | | | |
| | • Establish short, medium and long term objectives that require implementation | | X | | | |
| 8.2 Reach an agreement on roles and responsibilities on management objectives and local actions | • In participation with relevant stakeholders, develop an agreement on roles and responsibilities | | X | | | |
| **Strategic Objective 9. Devolution of management, benefits and responsibilities to other relevant institutions for the management of biological diversity, ecological and economic importance** | | | | | | |
| 9.1 Execute MoUs with communities | • Identify communities and stakeholders for authority | | X | X | | |

| | Activities | | | | | |
|---|---|---|---|---|---|---|
| and relevant sectors | transfer | | | | | |
| | • Hold mobilization meetings with stakeholders at key sites | | X | X | | |
| | • Conduct signing of MoU's that identify roles and responsibilities with communities | | X | X | | |
| 9.2 Progressively devolve responsibility for natural resources management to rural communities | • Hold discussions about problem animal control and alternative control measures with relevant communities | X | X | X | X | X |
| | • Develop modalities for progressive devolvement and co-partnership in problem animal control | X | X | | | |
| 9.3 Assist in building capacity of communities for biodiversity management through village Elephant councils | • Mobilise communities and create "*village Elephant councils*" that would play a vanguard role in Elephant protection | X | X | | | |
| | • Develop roles and modalities for village Elephant councils to be realized as local associations | X | | | | |
| | • Identify communal areas where human-Elephant conflict is most common | X | | | | |
| | • Identify community leaders and elders who have influence within human-Elephant conflict zones | X | | | | |
| | • Work with the community leaders to select members of the council (chair, vice-chair, secretary and treasurer) | X | X | | | |
| 9.4 Develop framework and guidelines for community based conservation operations | • Framework for community based conservation operations developed in participation with communities | X | | | | |
| *Strategic Objective 10. Improve conservation and management through National and International networking and collaboration* | | | | | | |
| 10.1 Develop a strategy that defines networking and collaboration needs at a national, regional and global level | • Develop a strategy that defines networking and collaboration at all levels | X | X | | | |
| | • Establish cross-sectoral collaborations with institutions whose activities might have impact on | X | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| | biodiversity conservation | | | | | |
| | • Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation | X | X | X | X | X |

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| *Strategic Objective 11  Enhance communication and image of BES* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 11.1 Carry out timed and appropriate awareness creation programmes to public to develop image of BES | • Develop awareness raising programmes for schools, admin bodies, farmers and pastoralists | X | X | X | X | X |

| | | | | | | |
|---|---|---|---|---|---|---|
| *Strategic Objective 12. Establish and develop tourism management system for BES and local community* | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 12.1  Develop tourist facilities and raise income from wildlife tourism | • Identification of sites for lodge and camping | X | | | | |
| | • Develop tourism development plan | X | | | | |
| | • Establish lodge | | X | X | X | |
| | • Secure safety of tourist | X | X | X | X | X |
| | • Identify wildlife viewing sites | X | X | | | |
| | • Establish lookout towers | X | X | | | |
| | • Develop income from tourism | X | X | X | X | X |
| | • Involve local communities in tourism | X | X | X | X | X |
| | • Identify and minimize impacts on scenic resources of importance | X | X | X | X | X |
| 12.2 Develop, manage and sell tourist products | • Identify tourism products at BES | X | | | | |
| | • Carry out a tourism feasibility study at BES | X | | | | |
| | • Identify stakeholders in tourism at BES | X | | | | |
| | • Develop a partnership action plan that considers all key stakeholders at BES | X | X | | | |
| | • Sensitize/mobilize community in the values and benefits of tourism | X | X | X | X | X |
| | • Carry out an environmental impact assessment with a focus on tourism at BES | X | X | X | | |
| | • Formalize partnerships and legal requirements on | X | X | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | tourism at BES | | | | | |
| | • Implement and mobilize resources for tourism development at BES | X | X | X | X | X |
| | • Develop a marketing strategy for BES | X | X | | | |
| | • Establish cooperatives from communities to sell their traditional/cultural products | X | X | | | |
| | • Train members of cooperatives to produce quality cultural products | X | X | | | |
| | • Train community tourist guides with appropriate guidelines | X | X | | | |
| | • Training of communities in sustainable resources use | X | X | X | X | X |

## 9.4 Five Years Indicative Budget

| Operational objectives | Activities | Ethiopian Budget Year (2011-2015) | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| *Strategic objective 1. Conserve biodiversity and maintain ecological processes* | | | |
| 1.1 Conservation and ecological status of BES key targets enhanced and threats reduced | • Prioritize critical habitats and core areas for protection against deforestation and fire<br>• Identify and preserve adequate areas of dry season water points and forage<br>• Assess the present distribution and status of African Elephant and other endangered mammalian species<br>• Strengthen efforts to reduce threats to African Elephants<br>• Undertake assessments and monitoring to understand human effects on key parameters of rivers and water catchments such as water flow, water quality and water extraction<br>• Raise awareness and advocate on issues affecting the riverine system and water catchments<br>• Establish stakeholder collaboration and partnerships to sustainably manage rivers, water catchments and endangered species<br>• Conduct research to better understand the migration movements, population dynamics, and disease prevalence of Elephants<br>• Conduct sound law enforcement to protect Elephants from poaching and human encroachments<br>• Advocate and collaborate with partners for the | 49,400.00 | |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| | protection of Elephant migration routes in BES and surroundings | | |
| 1.2 Regular monitoring and assessment of key ecosystem values and ecological processes strengthened | • Undertake assessments of biodiversity resources and key ecological functions | 21,000.00 | |
| | • Analyze and interpret satellite images, aerial photos and ground surveys to understand key ecological functions | | |
| | • Develop framework to sustainably monitor and manage ecological processes | | |
| 1.3 Develop and implement viable and sustainable area management programs | • Prepare Elephant management site action plan | 35,000.00 | Outsource |
| | • Identify levels and kinds of land use within the watersheds of BES | | |
| | • Develop watershed management program | | |
| | • Prepare fire management plan | | |
| | • Design strategy and prepare a CBEM Plan | | |
| | • Implement CBEM Plan | | |
| *Strategic Objective 2. Conduct biodiversity research and monitoring at BES* | | | |
| 2.1 Carry out detailed research, monitoring, inventories and regular surveys in BES | • Undertake detailed inventories and surveys on biodiversity potential of BES | 25,000.00 | Some of the researches like Genetic level studies could be conducted by university students and other interested researchers |
| | • Identify core wildlife areas for the keystone species | | |
| | • Map the vegetation types of the study area using satellite image and ground truthing | | |
| | • Determine factors affecting the Elephant population abundance and distribution | | Collaring, satellite image, etc., considered |
| | • Examine the genetic distinctiveness of the population of Elephants in Babile from the | | |

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| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| | other African Elephants | | |
| | • Investigate the influence of Elephants on the abundance and distribution of other wild herbivores in-terms of Elephant induced vegetation changes | | |
| | • Investigate the spatial and temporal movements of Elephants | | |
| | • Undertake thorough behavioral ecology studies on Elephants | | |
| | • Determine the relationship of local communities with the management of BES | | |
| | • Map land-use and land-cover patterns of the weredas within and adjoining the sanctuary | | |
| | • Map the distribution of invasive species such as *P. juliflora, P. hysterophorus, L. camara*, etc | | |
| | • Collect environmental data | | |
| 2.2 Ensure that all existing facilities, new developments and interventions in BES are subjected to appropriate Environmental Impact Assessments (EIAs) | • Develop EIA protocols for collecting pertinent data | 3,000.00 | Considering all development needs EIA and could be outsourced |
| | • Conduct EIAs for all major development activities within BES | | |
| | • Identify the impact of the existing developments on biodiversity resources of BES | | |
| | • Design intervention strategy | | |
| | • Prepare EIAs protocols | | |
| | • Prepare policy idea to avoid/minimize the impacts of developments to wildlife and their habitats in the future | | |
| 2.3. Ensure stable and healthy wildlife populations | • Conduct systematic disease surveillance and control | 13,500.00 | |

| Operational objectives | Activities | Ethiopian Budget Year (2011-2015) | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| | • Carry out immediate action to any carcasses of wild animals to minimize the probability of disease transmission burning, burying, etc) <br>• Form collaboration with government offices and local people to make sure that the domestic animals in the area are vaccinated to prevent disease transmission (collaboration with the veterinary services in the area) <br>• Raise awareness and educate the local communities about zoonotic diseases | | |
| 2.4. Improve conservation and management through national and international networking and collaboration | • Establish cross-sectoral collaborations with institutions whose activities might have impact on biodiversity conservation <br>• Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation i.e. CBD, SSC, WCI, CITES, CMS, Ramsar, etc <br>• Record the illegal killings of Elephants under the frame work of MIKE | 45,000.00 | Workshop, consultative meetings, brochures |
| Strategic Objective 3. Protect the biodiversity resources and ensure the security of BES | | | |
| 3.1. Conserve the exceptional resource of BES and halt illegal killing of Elephants | • Asses surveillance capacities <br>• Recruit and train scouts <br>• Conduct systematic surveillances <br>• Combat illegal trade in ivory <br>• Work closely with police and checkpoint workers <br>• Campaign law enforcement awareness program to various stakeholders such as judiciary, policy and the community | 15,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| | • Asses surveillance capacities | | |
| 3.2. Ensure sustainable use of resource and sound landscape management system | • Identify threats to wildlife resources<br>• Identify sites for wildlife and human use<br>• Conduct forums with stakeholders<br>• Discuss and agree on various land use options<br>• Develop bylaws on resource management<br>• Establish CBOs | 17,000.00 | |
| *Strategic Objective 4. Develop both human and physical resources to support viable conservation and management* | | | |
| 4.1 Strengthen BES management function | • Review the existing organizational and administrative structure to develop an appropriate and effective structure<br>• Manpower development and planning<br>• Provision of welfare facilities<br>• Provision of space, working tools, equipments<br>• Create conducive environment and safety at work | 65,000.00 | Office facilities, training professionals and management, welfare facilities |
| 4.2 Strengthen supportive law enforcement | • Identify gaps in law enforcement<br>• Demarcate the boundary BES<br>• Develop a zonation map for BES<br>• Gazette the sanctuary to a NP status | 11,000.00 | Re-demarcate Somali side – consultative meetings, beacon, gazettment |
| 4.3 Recruit Management staff and capacity building | • Identify gaps in manpower<br>• Recruit scouts and other staff<br>• Train staff | | |
| 4.4 Develop BES's Infrastructure for effective management and | • Identify gaps in manpower<br>• Recruit scouts and other staff | 610,000.00 | 1 office, 3 outposts, 250km new road and |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| patrolling | • Train staff<br>• Identify sites for office and outposts construction<br>• Construct new office, outposts and staff houses<br>• Construct new roads<br>• Maintain all roads used for management and patrolling<br>• Procure field material for surveillance | | 300 km maintenance |
| *Strategic Objective 5. Mitigate human-wildlife conflict at BES through active stakeholder participation* | | | |
| 5.1 Assess and present a situation analysis of current human-wildlife conflict at BES | • Identify key human-wildlife conflict zones within and around BES<br>• Complete a situation analysis showing incidences, costs and socio-economic implications<br>• Hold awareness workshops/meetings for stakeholders at Woreda and Zone | 9,000.00 | |
| 5.2 Conduct an awareness campaign on controlling problem animals | • Carry out an awareness raising campaign on alternatives on controlling problem animals | 9,600.00 | Consultative meetings, workshops, etc |
| 5.3 Create a partnership with local communities for solving problem animal control | • Create a partnership with local communities for solving problem animal control | 6,700.00 | |
| *Strategic Objective 6: Develop compatible land use practices within BES* | | | |
| 6.1 Develop a plan that explains current land use practices with | • Develop a plan that describes current land use at BES | 90,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| reference to current and potential threats | | | |
| 6.2 Produce a zoning plan for the Sanctuary allowing areas of strict conservation and multiple-use | • Develop a zoning plan for BES showing areas of strict conservation and multiple-use | 20,000.00 | |
| 6.3 Launch habitat connectivity and restoration activities at selected sites in BES | • Carry out detailed study on habitat connectivity and habitat restoration at selected sites in BES | 2,500.00 | |
| 6.4 Create awareness on the need of zoning the BES | • Carry out awareness programmes on zoning at BES | 3,500.00 | |
| 6.5 Develop a plan for gazettment of BES | • Develop a strategy and gazettment plan for BES | 1,500.00 | |
| *Strategic objective 7. Increase protection of migratory corridors and ensure natural habitat connectivity of key wildlife habitat* | | | |
| 7.1 Establishing Elephant corridors and maintain habitat connectivity | • Identify wildlife corridor<br>• Rehabilitate wildlife corridors<br>• Free the corridor from adverse human activities<br>• Protect the corridors for free wildlife movement<br>• Ensure free wildlife movement between valleys<br>• Identify wildlife corridors within BES | 5,600.00 | |
| *Strategic Objective 8. Develop efficient mechanisms, which will promote increased stakeholder support* | | | |
| 8.1 Develop a strategy for stakeholder support of BES | • Identify key stakeholders in and around BES<br>• Mobilize and sensitize stakeholders (propaganda) on their positive support for BES | 60,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| | • Identify conflicting needs on the resources of BES with stakeholders | | |
| | • Developing a common objective that serves both the BES and its stakeholders | | |
| | • Establish short, medium and long term objectives that require implementation | | |
| 8.2 Reach an agreement on roles and responsibilities on management objectives and local actions | • In participation with relevant stakeholders, develop an agreement on roles and responsibilities | 1,200.00 | |
| *Strategic Objective 9. Devolution of management, benefits and responsibilities to other relevant institutions for the management of biological diversity, ecological and economic importance* | | | |
| 9.1 Execute MoUs with communities and relevant sectors | • Identify communities and stakeholders for authority transfer<br>• Hold mobilization meetings with stakeholders at key sites<br>• Conduct signing of MoU's that identify roles and responsibilities with communities | 1,300.00 | |
| 9.2 Progressively devolve responsibility for natural resources management to rural communities | • Hold discussions about problem animal control and alternative control measures with relevant communities<br>• Develop modalities for progressive devolvement and co-partnership in problem animal control | 2,300.00 | |
| 9.3 Assist in building capacity of communities for biodiversity management through village | • Mobilise communities and create "*village Elephant councils*" that would play a vanguard role in Elephant protection | 35,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year (2011-2015) | |
|---|---|---|---|
| | | Indicative Budget in USD | Remark |
| Elephant councils | • Develop roles and modalities for village Elephant councils to be realized as local associations<br>• Identify communal areas where human-Elephant conflict is most common<br>• Identify community leaders and elders who have influence within human-Elephant conflict zones<br>• Work with the community leaders to select members of the council (chair, vice-chair, secretary and treasurer). | | |
| 9.4 Develop framework and guidelines for community based conservation operations | • Framework for community based conservation operations developed in participation with communities | 5,400.00 | |
| Strategic Objective 10. Improve conservation and management through National and International networking and collaboration | | | |
| 10.1 Develop a strategy that defines networking and collaboration needs at a national, regional and global level | • Develop a strategy that defines networking and collaboration at all levels<br>• Establish cross-sectoral collaborations with institutions whose activities might have impact on biodiversity conservation<br>• Adopt and domesticate international conventions, treaties and strategies dealing with environmental conservation | 57,000.00 | |
| Strategic Objective 11 Enhance communication and image of BES | | | |
| 11.1 Carry out timed and appropriate awareness creation programmes to public to develop | • Develop awareness programmes for schools, admin bodies, farmers and pastoralists | 35,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year *(2011-2015)* | |
|---|---|---|---|
| | | *Indicative Budget in USD* | *Remark* |
| image of BES | | | |
| *Strategic Objective 12. Establish and develop tourism management system for BES and local community* | | | |
| 12.1 Develop tourist facilities and raise income from wildlife tourism | • Identification of sites for lodge and camping<br>• Develop tourism development plan<br>• Establish lodge<br>• Secure safety of tourist<br>• Identify wildlife viewing sites<br>• Establish lookout towers<br>• Develop income from tourism<br>• Involve local communities in tourism<br>• Identify and minimize impacts on scenic resources of importance | 262,600.00 | |
| 12.2 Develop, manage and sell tourist products. | • Identify tourism products at BES<br>• Carry out a tourism feasibility study at BES<br>• Identify stakeholders in tourism at BES<br>• Develop a partnership action plan that considers all key stakeholders at BES<br>• Sensitize/mobilize community in the values and benefits of tourism<br>• Carry out an environmental impact assessment with a focus on tourism at BES<br>• Formalize partnerships and legal requirements on tourism at BES<br>• Implement and mobilize resources for tourism development at BES<br>• Develop a marketing strategy for BES<br>• Establish cooperatives from communities to sell their traditional/cultural products | 130,000.00 | |

| Operational objectives | Activities | Ethiopian Budget Year (2011-2015) | |
|---|---|---|---|
| | | Indicative Budget in USD | Remark |
| | • Train members of cooperatives to produce quality cultural products | | |
| | • Train community tourist guides with appropriate guidelines | | |
| | • Training of communities in sustainable resources use | | |

## 10  Bibliography

AfESG (2002). Minutes of the meeting of the IUCN/SSC African Elephant Specialist Group. 28 Jan. - 1 Feb. 2002, Shaba National Reserve, Kenya.

African Elephant Conservation Trust. (2002). http://www.Elephanttrust.org/scope_and_objectives.htm. Downloaded on September 8, 2009.

Allen-Rowlandson, T.S. (1990). *Elephant survey in Ethiopia*. A report submitted to the Ethiopian Wildlife Conservation Organization. Addis Ababa. pp.19.

Almaz Tadesse (2009). *Sustaining the Allideghi Grassland of Ethiopia: Influences of Pastoralism and Vegetation Change*. PhD Dissertation. Utah State University. Logan, UT.

Anonymous (2010). Threats caused by IAS. Institute of Biodiversity Conservation. http://www.ibc-et.org/conservation/invasive-species/threats-caused-by-ias. Downloaded October, 2009.

Ansell, W.F.H. (1971). Order Proboscidea. *In: The Mammals of Africa: An Identification Manual,* pp. 1-5, (Meester, J. and Setzer, H.A., Eds), Part 11, Smithsonian Institute Press, Washington.

Anteneh Belayneh (2006). *Floristic analysis and Ethnobotanical studies of the Natural Vegetation in the Babile Elephant Sanctuary, Ethiopia*. MSc Thesis, Addis Ababa University, Ethiopia.

Augeri, D. (2007). Habitat loss and fragmentation effects on Asian Elephant density and Distribution in the Leuser ecosystem of Sumatra, Indonesia. . *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Belayneh and Feaven Workeye (2008). Conservation and Investment: Observation from the Babile Elephant Sanctuary. Biodiversity newsletter, Addis Ababa, Ethiopia. http://www.ibc-et.org/Newsletter/tiki-read_article.php?articleId=6.

Barnes, R.F.W. and Bailey, B. (2004). Long-term management of crop-raiding by Elephants around Kakum Conservation Area in Southern Ghana. *Pachyderm* **37**: 68-72.

Barnes, R.F.W., Craig, G.C., Dublin, H.T., Overton, G., Simons, W. and Thouless, C.R. (1999). *African Antelope Database 1998*. IUCN/SSC African Elephant Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. X + 250pp.

Barnes, R.F.W. (1996). The conflict between humans and elephants in the central African forests. *Mammal Rev*. 26 (213): 67-80.

Beadles, J.K. (1968). *Elephants in Harer Province Ethiopia*. HSIU, Coll. Agric., Dire Dawa, Ethiopia. 9pp.

Biodiversity Conservation Guide (2005). Biodiversity Conservation: A Guide for USAID Staff And Partners. Produced for review by the USAID in cooperation with ARD, Inc., USAID technical staff, and partners. 206 pp.

Blanc, J. (2008a). *Loxodonta africana*. *In: IUCN 2009. IUCN Red List of Threatened Species*. Version 2009.2. <www.iucnredlist.org>. Downloaded on 30 October 2009.

Blanc, J. (2008b). *Loxodonta africana*. In: IUCN 2010. IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>. Downloaded on 20 June 2010.

Blanc, J.J., Barnes, R.F.W., Craig, G.C., Dublin, H.T., Thouless, C.R., Douglas-Hamilton, I. and Hart, J.A. (2007). *African Elephant Status Report 2007: an update from the African Elephant Database*. Occasional Paper Series of the IUCN Species Survival Commission, No. 33. IUCN/SSC African Elephant Specialist Group. IUCN, Gland, Switzerland. Vi + 276 pp.

Blanc, J.J., Thouless, C.R., Hart, J.A., Dublin, H.T., Douglas-Hamilton, I., Craig, G.C. and Barnes, R.F.W. (2003). *African Elephant Status Report 2002: an update from the African Elephant Database*. Occasional Paper Series of the IUCN Species Survival Commission, No. 33. IUCN/SSC African Elephant Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK. Vi + 304 pp.

Blower, J. (1968). The wildlife of Ethiopia. *Oryx* **9**(4): 276-285.

Bolton, M. (1973). Notes on the current status and distribution of some large mammals in Ethiopia (excluding Eritrea). *Mammalia* **37** (4):562-58.

Burrill, A. and Douglas-Hamilton, I. (1987) *African Elephant Database Project: Final Report*. UNEP/GRID, Nairobi.

Buckland, S.T., Anderson, D.R., Burnaham, K.P. and Laake, J. L. (1993). *Estimating abundance of biological populations*. Distance sampling. Chapman and Hall, London.

Caldecott, J. (1997). Indonesia. In E. Lutz, & J. Caldecott (Eds.), *Decentralization and Biodiversity Conservation* (pp. 43-53). Washington D.C.: The World Bank.

Ceballos-Lascurain, H. (1996). *Tourism, ecotourism, and protected areas* The World Conservation Union, Gland, Switzerland.

Cantor, C.S. (2009). Poaching Still a Threat to Elephants despite International Ban of Ivory Sale. Downloaded November 29, 2009.
http://www.worldwildlife.org/species/finder/africanelephants/threats.html.

Central Statistical Agency (CSA) (2006). *Statistical Abstract 2005*. Addis Ababa, Ethiopia: Central Statistical Agency.

Chardonnet, Ph,. des Clers B., Fischer J., Gerhold, R.. Jori, F., and Lamarque, F. (2002). The Value of Wildlife. Rev. Sci. tech Off. int Epiz 2002. 21 (11): 15-51.

Chase, M. and Griffin, C. (2007). Elephants of southeast Angola in war and peace: their decline, re-colonization and current status. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Cherie Enawgaw (1996). Distribution, abundance and age structure of Elephants in Omo National Park. *Walia* **17**: 17-26.

Christoffersen, N., Cambell, B. and du Toit, J. (1998). Communities and sustainable use: Pan African perspectives. Proceedings of the Pan-African Symposium on the sustainable use of natural resources and community participation. IUCN, Regional Office for Southern Africa. Harere, Zimbabwe. 179 pp.

Clover, C. (1995). African Elephants dying despite ban on ivory trade. *Daily Telegraph*, 21 January:

Cohn, R. (1994). "The people's war on poaching." Audubon, 96 (2):70-85. "Continent still split over imposition of worldwide ivory ban." 1992. Reuter, 1 April.

Cumming, D.H.M., Du Toit, R.F. and Stuart, S.N. (1990). *African Elephant and Rhinos status survey and conservation action plan*. IUCN/SSC African Elephant Specialist Group. IUCN, Gland, Switzerland. 77pp.

Cushman, S., Chase, M. and Griffin, C. (2007). Transboundary Elephant movements are affected by land-use, roads, water and fences. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

DoWAF (2004). *Integrated water resources management: guidelines for stakeholder participation in integrated water resources management in water management areas in Southern Africa*: A pilot study funded by Danida. Department of Water Affairs and Forestry. South Africa.

Daniel Gamechu (1977). Aspects of climate and water budget in Ethiopia. Addis Ababa University Press. Addis Ababa, Ethiopia.

Demel Teketay (1995). Floristic composition of Dakata Valley, southeast Ethiopia: An implication for the conservation of biodiversity. *Mountain Chronicles* **15**(2): 183-186.

Destifano, E. (undated). Human-Wildlife Conflict worldwide: collection of case studies, analysis of management strategies and good practices. pp. 29.

Douglas-Hamilton, I. (1972). *On the ecology and behavior of the African Elephant*. PhD Thesis, University of Oxford.

DSE (1999). *Land Use Planning for Protected Areas System (PAS).* Course Reader. August 17 to September 7, 1999. German Foundation for International Development, ZEL. Zschortau, Germany.

Dublin, H. (2007). A tale of four regions: the status, threats and challenges facing the management and conservation of Africa's Elephants across their range. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Dudley, N. (Editor) (2008). *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: IUCN. x + 86pp.

Eggert, L.S., Rasner, C.A. and Woodruff, D.S. (2002). The evolution and phylogeography of the African Elephant inferred from mitochondrial DNA sequence and nuclear microsatellite markers. *Proceedings of the Royal Society (London) Bulletin,* **269**: 1993-2006.

Ephrem Hassen. (2008). Key energy issues in Ethiopia: Challenges, opportunities and the way forward. *In: Agro-fuel Development in Ethiopia: Rhetoric, Reality and Recommendations, (*Tibebwa Heckett and Negusu Aklilu, eds). pp. 1-25. Forum for Environment, Addis Ababa, Ethiopia.

Ethiopian Wildlife and Natural History Society (EWNHS) (1996). *Important Bird Areas of Ethiopia.* A first inventory. Addis Ababa. pp. 300.

Ferdu Azerefegne and Tsedeke Abate (2007). Phase I. Country background papers, Ethiopia (pp. 3- 35). Pesticide Action Network UK. (Eds Brigitte Nyambo, B. and Youdowei, A. 2007), IPM Research Project. pp. 171.

Francois, van der W.H., Saiwana, L. and Van der Westhuizen, E. (2007). Long-term partnerships in conservation: a case-study from north Luangwa, Zambia. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Franklin, I.R. (1980). Evolutionary change in small populations. In *Conservation Biology: An evolutionary-ecological perspectives,* pp.135-150, (Soule, M.E. and Wilcox, B.A., eds). Sinauer Associates, Sunderland, Mass.

Bank, F.G., Irwin, C.L., Evink, G.L., Gray, M.E., Hagood, S., Kinar, J.R., Levy, A., Paulson, D., Ruediger, B., Sauvajot, R.M., Scott, D.J. and White, P. (2002). Wildlife Habitat Connectivity across European Highways. Office of International Programs FHWA/US DOT (HPIP) 400 Seventh Street, SW Washington, DC. http://international.fhwa.dot.gov/wildlife_web.htm

Funaioli, U. and Simonetta, A.M. (1966). The mammalian fauna of the Somali Republic: Status and conservation problems. *Monit. Zool. Ital*. **74**: 285-347.

Gamachu, D. (1977). *Aspects of climate and water budget in Ethiopia*. Addis Ababa University Press, Addis Ababa, Ethiopia.

Gobush, K.S., Mutayoba, B.M. and Waaser, S.K. (2007). Long-term consequences of poaching on relatedness and physiological health of African Elephants. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Graham A. Cherie Enawgaw and Bereket Netsreab (1996). Trends in large herbivores of Omo and Mago National Parks. NPRSEP, Technical report No.5.

Graham A., Cherie Enawgaw and Bereket Netsreab (1997). Trends in large animals of Omo and Mago National Parks. NPRSEP, Technical report No.6.

Grubb, P., Groves, C.P., Gudley, J.P. and Shoshani, J. (2000). Living African Elaphants belong to two species: *Loxodonta Africana* (Blummenbach, 1979) and *Loxodonta cyclotis* (Matschie, 1900). *Elephant* 2 (4): 1-4.

Harris, L.D. and Scheck, J. (1991). From implications to applications: the dispersal corridor theory applied to the conservation of biological diversity. *In: Nature Conservation 2: the role of corridors.* Survey Beatty and Sons. NSW, Australia.

Hart, J.A. and Smith, K.S. (2001). Monitoring Illegal Killing of Elephants (MIKE) Central African Pilot Project**.** Technical Report No 3. Monitoring of Elephant Poaching, Anti-Poaching Effort, And Law Enforcement in Central Africa. http://www.cites.org/eng/prog/MIKE/pilot/tech_rep3.shtml

Hedges, S. and Gunaryadi, D. (2007). Reducing human-Elephant conflict: do chilies really deter Elephants from entering crop fields? *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Helen, P. (1989) *Villagization in a peasant association in Menz*. Addis Ababa, Ethiopia.
Hillman, J.C. (1993). *Ethiopia*: *Compendium of wildlife conservation information*. Ethiopian Wildlife Conservation Organization and New York Zoological Society, Addis Ababa, Ethiopia.

Hunt, J.A. (1951). A general survey of the Somaliland Protectorate 1944-1950. London and Dunstable: Waterlow and Sons, VII + 23 pp.

IUCN (1994). *Guidelines for Protected Areas Management Categories.* IUCN, Cambridge, UK and Gland, Switzerland. pp. 261.

Jacobs, M.J. and Schloeder, C.A. (2001). *Impacts of Conflict on Biodiversity and Protected Areas in Ethiopia.* Washington, D.C., Biodiversity Support Program.

Kumar, M.A. (2007). Influence of habitat fragmentation and human presence on Asian Elephant movements and behavior in the Anamalai Hills, Western Ghats, India. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Largen, M.J. and Yalden, D.W. (1987). The decline of Elephant and black rhinoceros in Ethiopia. *Oryx,* **21**(2): 103-106.

Leader-Williams, N. and Albon, S.D. (1988). Allocation of resources for conservation. *Nature* **336:** 533-535.

Leader-Williams, N., Albon, S.D., and Berry, P.S.M. (1990). Illegal exploitation of black rhinoceros and Elephant populations: Patterns of decline, law enforcement and patrol effort in Luangwa Valley, Zambia. *J. of App. Ecol.* **27**: 1055-87.

Leggett, K.E.A. (2006). Home range and seasonal movement of Elephants in the Kunene Region, North-west Namibia. *African Jou. Zoology* **41**: 17-36.

Lerise, F and Schuler, U. (1986). *Conflicts between wildlife and people: village development planning for three settlements bordering the Selous Game Reserve.* A study for the Selous Conservation Programme, GTZ. Dar-es-Salaam, Tanzania. pp. 186.

Lisanework Nigatu, Heluf Gebrekidan and Muktar Mohammed (2007). *Environmental Impact Assessment of the Casto Bean Production Project of the Flora Eco Power Company in East Harerghe Zone* (commissioned by Flora Eco Power Company), Haromaya, Ethiopia.

Lydekker, R. (1907). The ears as a race character in the African Elephant. *Proceedings of the Zoological Society of London* **1907**: 380-403.

Mackey, R. L, Woolley, L-A., Page, B. and Slotow, R. (2007). Elephant demographic and behavioral consequences of stochastic events and massive human interventions. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Maglio, V.J. (1973) Origin and evolution of the *Elephantidae. Trans. Amer. Phil. Soc.* 63:1-149.

Martin, E. and Vigne, L. (2010). The Status of the retail ivory trade in Addis Ababa in 2009. *TRAFFIC Bulletin* **22**(3): 141-146.

Mihret Ewnetu, Fedlu Abdela, Aklilu Kebede, Roman Kassahun, Hailu Mecha and Wondossen Sissay. (2006). An overview of wildlife status, habitat conditions the threats of Babile Elephant Sanctuary and possibilities of boundary demarcation. Ethiopian Wildlife Conservation Organization. Addis Ababa, Ethiopia. 24 pp.

Milliken, T., Burn, R.W. and Sangalakula, L. (2002). *A report on the status of the Elephant Trade Information System (ETIS) to the 12th meetings of the Conference of the Parties*, CoP12 Doc 3.41, Annex 1. CITES Secretariat, Geneva, Switzerland.

Milner-Gulland, E.J. and Leader-Williams, N. (1992). A model of incentives for the illegal exploitation of black rhinos and Elephants: Poaching pays in Luangwa Valley, Zambia. *J. of App. Ecol.* **29** (2): 388-401.

Mohr, P.A. (1971). *The geology of Ethiopia*. University College of Addis Ababa Press, Ethiopia. 268 pp.

Moss, C.J. (1988). *Elephant Memories: Thirteen Years in the Life of an Elephant Family*. William Morrow, New York.

Moss, C.J. (1996). Getting to know a population. In*: Studying Elephants*, Kangwana, K., ed.). AWF Technical Handbook Series 7, African Wildlife Foundation, Kenya.

Moss, C.J. (2001). The demography of an African Elephant (*Loxodonta africana*) population in Amboseli, Kenya. *J. Zool., Lond*. **255**: 145-156.

Moss, C.J. and Poole, J.H. (1983). Relationships and social structure of African Elephants. In: *Primate social relationships: An integrated approach* (Hinde, R.A. ed), Pp 315-325. Blackwell, Oxford, U.K.

Mubalama, L, and Mushenzi, N. (2004) Monitoring law enforcement and illegal activities in the northern sector of the Parc National des Virunga, Democratic Republic of Congo. *Pachyderm* 36:16-29.

Munshi-South, J., Tchignoumba, L., Brown, J., Abbondanza, N., Maldonado, J., Henderson, A. and Alonso, A. (2007). Physiological stress and individual movements of African forest Elephants (*Loxodonta africana*) in relation to anthropogenic disturbance in Gabon. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Muruthi, P. (2005). Human wildlife conflicts: lessons learned from AWF's African heartlands. AWF Working Papers. Nairobi, Kenya, African Wildlife Foundation.

Muoria, P.K., Muruthi, P., Kariuki, W.K., Hassan, B.A., Mijele, D. and Oguge, N.O. (2007). Anthrax outbreak among Grevy's zebra (Equus grevyi) in Samburu, Kenya. Afr. J. of Eco. 45(4): 483-489.

Negarit Gazeta. 1944. A proclamation to make provision for the preservation of game. No. 61 of 1944, order no. 9,  May 29, Addis Ababa. Ethiopia.

Negarit Gazeta (1969). An Order to Provide for the Establishment of the Awash National Park'. Order No. 54 of 1969, No. 4, 6 January, Addis Ababa, Ethiopia.

Negarit Gazeta (1969). An Order to Provide for the Establishment of the Simen National Park'. Order No. 59 of 1969, No. 392, 31st October, Addis Ababa, Ethiopia

Negarit Gazeta (1970). An order to provide for the establishment of a wildlife conservation organization. No. 65 of 1970, Order no. 4, 5 November. Addis Ababa, Ethiopia.

Negarit Gazeta (1974). Regulations issued pursuant to the Game Proclamation of 1944 and the Wildlife Conservation Order of 1970. Legal Notice No. 445 of 1974, No. 9, 12 February, Addis Ababa, Ethiopia.

Negarit Gazeta (1980). A Proclamation to Provide for the Conservation and Development of Forest and Wildlife Resources. No. 192 of 1980, No. 17, 5 September. Addis Ababa, Ethiopia.

Negarit Gazeta (1994). A Proclamation to Provide for the Conservation, Development and Utilization of Forests. No. 94 of 1994, No. 80, 28 March, Addis Ababa, Ethiopia.

Negarit Gazeta (2007). A proclamation to provide for the Development, Conservation and Utilization of Wildlife, No. 541/2007. No.51, Addis Ababa, Ethiopia. 21st August 2007.

Negarit Gazeta (2008).  A proclamation to provide for the Establishment of the Ethiopian Wildlife Development and Conservation Authority. No. 575/2008. No.31, Addis Ababa, Ethiopia. 22nd May 2008.

Negarit Gazeta (2008). Council of Ministers Regulation to Provide for Wildlife Development Conservation and Utilization. 15th year No.26 Addis Ababa 18th February 2009.

Negusu Tefera  (2009). Potential of *Prosopis juliflora* for bioethanol production. MSc. Thesis, Addis Ababa University, Addis Ababa, Ethiopia.

ÖBF (Österreichische Bundesforeste AG) 2009. Assessment of the Value of the Protected Area System of Ethiopia, "Making the Economic Case". Vol. II. Addis Ababa, Ethiopia. pp. 100.

Osborn, E.V and Parker, G.E (2003). Linking two Elephant refuge with a corridor in the communal land of Zimbabwe. *Afr. J. Ecol*. **41**: 68-74.

Pankhurst, R. (1992). The history of deforestation and afforestation in Ethiopia prior to World War I. Presented to the Sixth MSU Conference on Northeast Africa. Addis Ababa University. pp. 275-286.

Pattanakaew, P., Hedges, S. and Kaewket, C. (2007). Economic analysis of crop depredation by Elephants at Thailand's Kaeng Krachan National Park suggests land-use change not crop guarding is the solution. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Patwary, K. H. (2008). Assessing stakeholder participation in co-management activities at Chunati Wildlife Sanctuary. *In: Connecting Communities and Conservation: Collaborative management of protected areas in Bangladesh,* pp. 107-138. (Bushley, F.J., Wendy, B.R., Quazi, S. and Quazi, M., eds), East-West Centre and Nishorogo Programme of Bangladesh Forest Department.

Philip Briggs, (2002). *Ethiopia: The Bradt Travel Guide*, 3rd edition (Chalfont St Peters: Bradt), p. 367.

Rezene Fissehaie (2009). The Status of Bio-fuels in Ethiopia: Opportunities and Challenges. IUCN Regional Workshop on Bio-fuel Production and Invasive Species, 20- 22 April 2009, Nairobi Kenya.
http://cmsdata.iucn.org/downloads/04__status_of_biofuels_in_ethiopia__rezene_fessehaie.pdf

Roca, A.L., Georgiadis, N., Pecon-Slattery, J. and O'Brien, S.J. (2001). Genetic evidence for two species of Elephant in Africa. *Science* **293**: 1473-1477.

Roca, A. L., Georgiadis, N. and O'Brien, S.J. (2005) Cyto-nuclear genomic dissociation in African elephant species. *Nature Genetics* **37**(1):96-100.

Sitati, N. (2007). Human-Elephant conflict: main issues and potential solutions. *21st Annual Meeting of the Society for Conservation Biology: One World, One Conservation, One Partnership.* 1-5 July 2007, Port Elizabeth, South Africa.

Stephenson, J. and Mizuno, A. (1978). Recommendations for the Conservation of Wildlife in the Omo-Tama-Mago Rift Valley of Ethiopia. Report to the Wildlife Conservation Department of the Provincial Military Government of Socialist Ethiopia.

Stephenson, J. G. (1976). Reports on the Harer Elephant dilemma. EWCO, Addis Ababa, Ethiopia. Pp 22 + Maps.

Tadesse Gebre-Michael, Tesfaye Hundessa, and Hillman, J.C. (1992). The effect of war on world heritage sites and protected areas in Ethiopia. *In: World Heritage Twenty Years Later, (*Thorssel, J. and Swayer, J., eds). IUCN and UNESCO, Gland, Switzerland.

Shibru Tedla (1995) Protected area management crisis in Ethiopia. *Walia* **16**: 17–30.

Thompson, D. M. (Ed.) (1997). *Multiple land-use: The experiment of the Ngorongoro Conservation Area, Tanzania.* IUCN, Gland, Switzerland and Cambridge, UK. x + 486pp.

U.S. Fish and Wildlife Service (USFWS). (2004). 16 USC 4201-4246 African Elephant Conservation Act. Chapter 62—African Elephant Conservation. 7 pp.

USAID (2005).*Biodiversity Conservation: A guide for USAID staff and partners.*  U.S. Agency for International Development, Washington DC. 197 pp.

Vihemaki, H. (2005). Politics of Participatory Forest Conservation: Cases from the East Usambara Mountains, Tanzania. The Journal of Trans-disciplinary Environmental Studies, Special Issue 4(2): 1-15.

Watson, R.M. and Bell, R.H.V. (1969). The distribution, abundance and status of Elephant in the Serengeti region of northern Tanzania. *J. of App. Eco.* **62**: 115- 132.

Worku Tessema (2000). *Stakeholder participation in policy processes in Ethiopia. Managing Africa's Soils.* No 17. IIED Drylands Programme. Edinburgh, UK. 24 pp.

WSD and EWCA (2010). Revised boundary of Babile Elephant Sanctuary. Wildlife for Sustainable Development in collaboration with the Ethiopian Wildlife Conservation Authority. Addis Ababa, Ethiopia.

WWF (2009). African Elephant: Threats. http://www.worldwildlife.org/species/finder/africanelephants/threats.html. Downloaded September, 2009.

Yalden, D.W., Largen, M.J. and Kock, D. (1986). Catalogue of the mammals of Ethiopia 6. Perrissoddactyla, Proboscidea, Hyracoidea, Lagomorpha, Tubulidentata, Sirenia and Cetacea. *Monitore Zoologico italiano (NS) Supplimento* **21**(4): 31-103.

Yirmed Demeke (1994). Elephants in the Mago National Park: an assessment of number, distribution and movements. *Walia* **15**: 23-32.

Yirmed Demeke and Mihret Ewnetu (2008). Bird list of Babile Elephant Sanctuary. pp.  5.

Yirmed Demeke (2009). The Ecology and Conservation of the Relic Elephant Population in the Horn of Africa. PhD Thesis, University of Melbourne, Australia.

Yirmed Demeke and Negusu Aklilu (2008). Alarm bell for biofuel development in Ethiopia: the case of . *In: Agrofuel Development in Ethiopia: Rhetoric, Reality and Recommendations, (*Tibebwa Heckett and Negusu Aklilu, eds). pp. 83-113. Forum for Environment, Addis Ababa, Ethiopia.

Yirmed Demeke, Marilyn, B.R, Roger, V.S. and Richard, F.B. (2006). The undisclosed facts about the relic Elephant population in the Horn of Africa. Proceedings of Biological Society of Ethiopia, 16th annual conference and workshop. 13 pp.

Zelealem Wodu (2007). Elephant and anthropogenic impacts on woody plant species in Babile Elephant Sanctuary, Eastern Ethiopia. Addis Ababa University, MSc Thesis. Addis Ababa, Ethiopia.

# 11 Appendices

**Appendix 1**. List of the mammals of BES (after Hillman, 1993 and Yirmed Demeke, 2009).

| Order/Family | Common name | Observed |
|---|---|---|
| **Order Rodentia** – Rodents | | |
|   Family Sciuridae - Squirrels | | |
|     Xerus rutilus | Unstriped Ground Squirrel | x |
|   Family Muridae - Rats, Mice | | |
|     *Acomys cahirinus* | Spiny Mouse | |
|   Family Ctenodactylidae | | |
|     *Pectinator spekei* | Speke's Pectinator | |
|   Family Hystricidae - Porcupine | | |
|     *Hystrix cristata* | Crested Porcupine | x |
| **Order Primate -** Monkeys & Bush babies | | |
|   Family Cercopithecidae - monkeys | | |
|     *Cercopithecus aethiops* | Grivet Monkey | x |
|     *Papio Anubis* | Anubis Baboon | x |
|     *Papio hamadryas* | Hamadryas Baboon | x |
| **Order Carnivora** - Carnivores | | |
|   Family Mustelidae | | |
|     *Mellivora capensis* | Ratel | |
|   Family Canidae – Dogs | | |
|     *Otocyon megalotis* | Bat-eared Fox | x |
|     *Canis mesomelas* | Black-backed Jackal | x |
|   Family Viverridae | | |
|     *Genetta maculate* | Rusty-spotted Genet | x |
|     *Ichneumia albicauda* | White-tailed Mongoose | x |
|   Family Hyaenidae - Hyaenas | | |
|     *Crocuta crocuta* | Spotted Hyaena | x |
|   Family Felidae | | |
|     *Acinonyx jubatus* | Cheetah | |
|     *Panthera pardus* | Leopard | x |
|     *Panthera leo* | Lion | x |
| **Order Artiodactyla** - Even-toed Ungulates | | |
|   Family Suidae – Pigs | | |
|     *Phacochoerus africanus* | Common Warthog | x |
|   Family Bovidae | | |
|     *Sylvicapra grimmia* | Common Duiker | x |
|     *Oreotragus oreotragus* | Klipspringer | x |
|     *Madoqua saltiana* | Salt's Dikdik | x |
|     *Madoqua guentheri* | Guenther's Dikdik | x |
|     *Gazella soemmerringii* | Soemmerring's Gazelle | |
|     *Litocranius walleri* | Gerenuk | |
|     *Oryx gazelle* | Oryx | |
|     *Tragelaphus imberbis* | Lesser Kudu | x |
|     *Tragelaphus strepsiceros* | Greater Kudu | x |
|     *Tragelaphus scriptus* | Bushbuck | x |
| **Order Proboscidea** - Elephant | | |
|   Family Elephantidae | | |
|     *Loxodonta Africana* | African Elephant | x |
| **Order Hyracoidea** - Hyraces | | |
|   Family Procaviidae | | |
|     *Procavia capensis* | Rock Hyrax | x |
| **Order Lagomorpha** - Hares | | |
|   Family Leporidae | | |
|     *Lepus habessinicus* | Abyssinian Hare | x |

**Appendix 2.** List of the birds of BES (after Yirmed Demeke and Mihret Ewnetu, 2004).

| Order/Family | English Name | Status | Biome/ Threat Level |
|---|---|---|---|
| **Order Ciconiiformes** | | | |
| Family Ardeidae | | | |
| *Bubulcus ibis* | Cattle Egret | AM | |
| Ardea melanocephala | Black-headed Heron | R | |
| Family Scopidae - Hammerkop | | | |
| Scopus umbretta | Hammerkop | R | |
| Family Ciconiidae - Storks | | | |
| Ciconia abdimii | Abdim's Stork | AM | |
| Leptoptilos crumeniferus | Marabou Stork | R | |
| Family Threskiornithidae - Ibises | | | |
| Bostrychia hagedash | Hadada Ibis | R | |
| Threskiornis aethiopicus | Sacred Ibis | R | |
| **Order Anseriformes** | | | |
| Family Anatidae - Ducks, Geese | | | |
| Alopochen aegyptiacus | Egyptian Goose | R | |
| **Order Accipitriformes** | | | |
| Family Accipitridae | | | |
| *Elanus caeruleus* | Black-shouldered Kite | R | |
| Milvus migrans | Black Kite | NM | |
| Neophron percnopterus | Egyptian Vulture | R | |
| Necrosyrtes monachus | Hooded Vulture | R | |
| Gyps africanus | African White-backed Vulture | R | |
| Circaetus cinereus | Brown-snake Eagle | R | |
| Terathopius ecaudatus | Bateleur | R | |
| Circus macrourus | Pallid Harrier | NM | |
| Melierax metabates | Dark Chanting Goshawk | R | |
| Melierax canorus | Pale Chanting Goshawk | R | SM |
| Melierax gabar | Gabar Goshawk* | R | |
| Accipiter castanilius | Chestnut-flanked Sparrow-hawk | R | |
| Buteo augur | Augur Buzzard | R | |
| Aquila rapax | Tawny Eagle | NM | |
| Hieraetus spilogaster | African Hawk-eagle | R | |
| Lophaetus occipitalis | Long-crested Eagle | R | |
| Polemaetus bellicosus | Martial Eagle | R | |
| **Order Falconiformes** | | | |
| Falconidae - Falcons | | | |
| Falco naumanni | Lesser Kestrel | NM | V |
| Falco tinnunculus | Common Kestrel | NM | |
| **Order Galliformes** | | | |
| Family Phasianidae - Francolins | | | |
| Francolinus sephaena | Crested Francolin | R | |
| Francolinus leucoscepus | Yellow-necked Spurfowl | R | SM |
| Francolinus castanelcollis | Chestnut-napped Francolin | R | |
| Family Numididae - Guinea-fowl | | | |
| Numida meleagris | Helmeted Guineafowl | R | |
| **Order Gruiformes** | | | |
| Family Otididae - Bustards | | | |
| Ardeotis kori | Kori Bustard | R | |
| Eupodotis ruficrista | Buff-Crested Bustard | R | SM |

| Order/Family | English Name | Status | Biome/ Threat Level |
|---|---|---|---|
| Eupodotis senegalensis | White-bellied/Senegal Bustard | R | |
| Eupodotis humilis | Little Brown Bustard | R | SM |
| **Order Charadriiformes** | | | |
| Family Burhinidae - Thicknees | | | |
| Burhinus capensis | Spotted Thicknee | NM | |
| Family Charadriidae | | | |
| Charadrius hiaticula | Ringed Plover | NM | |
| Charadrius tricollaris | Three-banded Plover | R | |
| *Vanellus tectus* | Black-headed Lapwing | R | |
| Hoplopterus coronatus | Crowned Lapwing | R | |
| Family Scolopacidae - Sandpipers | | | |
| *Tringa ochropus* | Green Sandpiper | NM | |
| Calldris minuta | Little Stint | NM | |
| **Order Pterociidiformes** | | | |
| Family Pterociidae - Sandgrouse | | | |
| Pterocles exustus | Chestnut-bellied Sandgrouse | R | |
| **Order Columbiformes** | | | |
| Family Columbidae - Pigeons, Doves | | | |
| Columba guinea | Speckled Pigeon | R | |
| Streptopelia capicola | Ring-necked Dove | R | |
| Streptopelia semitorquata | Red-eyed Dove | R | |
| Streptopelia decipiens | African Mourning Dove | R | |
| Streptopelia senegalensis | Laughing Dove | R | |
| Oena capensis | Namaqua Dove | R | |
| Turtur chalcospilos | Emerald-spotted Wood Dove | R | |
| Treron waalia | Bruce's Green Pigeon | R | |
| **Order Psittaciformes** | | | |
| Family Psittacidae - Parrots, Lovebirds | | | |
| Poicephalus rufiventris | African Orange-bellied Parrot | R | SM |
| Agapornis taranta | Black-winged Lovebird | NE | |
| **Order Cuculiformes** | | | |
| Family Musophagidae - Turaco | | | |
| Tauraco leucotis | White-cheeked Turaco | R | AH |
| Corythaixoides personata | Bare-faced Go-away Bird | R | |
| Corythaixoides | White-bellied Go-away Bird | R | SM |
| Family Cuculidae - Cuckoos | | | |
| Clamator jacobinus | Black-and-White Cuckoo | AM | |
| Clamator levalliantii | Levalliant's Cuckoo | AM | |
| *Cuculus canorus* | Eurasian Cuckoo | NM | |
| Cuculus solitarius | Red-chested Cuckoo | AM | |
| Cuculus clamosus | Black Cuckoo | AM | |
| Chrysococcyx klass | Klaas's Cuckoo | R | |
| Chrysococcyx caprius | Diederik Cuckoo | AM | |
| Centropus supercillosus | White-browed Coucal | R | |
| **Order Strigiformes** | | | |
| Family Strigidae | | | |
| Bubo africanus | Spotted-eagle Owl | R | |
| **Order Apodiformes** | | | |
| Family Apodidae - Swifts | | | |
| Apus affinis | Little Swift | R | |
| **Order Colliformes** | | | |
| Family Collidae - Mousebirds | | | |

| Order/Family | English Name | Status | Biome/ Threat Level |
|---|---|---|---|
| Collus striatus | Speckled Mousebird | R | |
| Collus macrourus | Blue-naped Mousebird | R | |
| **Order Coraciformes** | | | |
| Family Alcedinidae - Kingfishers | | | |
| Halcyon senegalensis | Brown-hooded Kingfisher | R | |
| Halcyon leucocephala | Grey-headed Kingfisher | AM | |
| Ceyx picta | African Pygmy Kingfisher | R | |
| Family Meropidae - Bee-eaters | | | |
| Merops pusillus | Little Bee-eater | R | |
| Merops variegates | Blue-breasted Bee-eater | R | |
| Merops persicus | Blue-cheeked Bee-eater | AM/N M | |
| Merops apiaster | Eurasian Bee-eater | NM | |
| Family Coraciidae - Rollers | | | |
| Coracias garrulous | Eurasian Roller | NM | |
| Coracias abyssinica | Abyssinian Roller | AM | |
| Coracias caudate | Lilac-breasted Roller | AM | |
| Coracias naevia | Rufous-crowned Roller | R | |
| Family Upupidae | | | |
| Upupa epops | African Hoopoe | AM/N M | |
| Family Phoeniculidae - Wood-hoopes | | | |
| Phoeniculus purpureus | Green Wood-hoopoe | R | |
| Phoeniculus somaliensis | Black-billed Wood-hoopoe | R | SM |
| Phoeniculus minor | Abyssinian Scimitarbill | R | SM |
| Family Bucerotidae - Hornbills | | | |
| Tockus nasutus | African Grey Hornbill | R | |
| Tockus erythrorhynchus | Red-billed Hornbill | R | |
| Tockus deckeni | Von der Decken's Hornbill | R | SM |
| Tockus flavirostris | Yellow-billed Hornbill | R | SM |
| Tockus hemprichii | Hemprich's Hornbill | R | SM |
| Bycanistes brevis | Silvery-cheeked Hornbill | R | |
| Bucorvus abyssinicus | Abyssinian Ground Hornbill | R | |
| **Order Piciformes** | | | |
| Family Capitonidae - Barbets | | | |
| Pogoniulus pusillus | Red-fronted Tinker bird | R | |
| Lybius gulfsobalito | Black-billed Barbet | R | |
| Trachyphonus darnaudii | D'arnaud's Barbet | R | SM |
| Family Indicatoridae | | | |
| Indicator indicator | Greater Honeyguide | R | |
| Family Picidae - Woodpecker | | | |
| Campethera nubica | Nubian Woodpecker | R | |
| *Dendropicos fuscescens* | Cardinal Woodpecker | R | |
| Thripias namaquus | Bearded Woodpecker | R | |
| **Order Passeriformes** | | | |
| Family Hirundinidae | | | |
| Psalidoprocne pristoptera | Black Saw-wing | R | |
| Hirundo rustica | Barn Swallow | NM | |
| Hirundo daurica | Red-rumped Swallow | NM | |
| Riparia riparia | European Sand-martin | NM | |
| Family Motacillidae | | | |
| Anthus novaeseelandiae | Richard's Pipit | R | |

| Order/Family | English Name | Status | Biome/ Threat Level |
|---|---|---|---|
| Anthus similes | Long-billed Pipit | R | |
| Family Motacillidae - Wagtails, Pipits | | | |
| Motacilia alba | White Wagtail | NM | |
| Motacilia aguimp | Pied Wagtail | NM | |
| Family Pycnonotidae | | | |
| Phyllastrephus strepitans | Northern Brownbul | R | |
| Pycnonotus barbatus | Common Bulbul | R | |
| Family Turdidae - Thrushes | | | |
| Monticola saxatilis | Common Rock-Thrush | NM | |
| Monticola rufocinereus | Little Rock-thrush | R | |
| Turdus pelios | African Thrush | R | |
| Cercotrichas leucophrys | White-browed Scrub-robin | R | |
| Cossypha natalensis | Ruppell's Robin-chat | R | AH |
| Cossypha albicapilla | White-crowned Robin-Chat | R | |
| Irania gutturalis | Irania/White-throated Robin | R | |
| Phoenicurus phoenicurus | Eurasian Redstart | NM | |
| Oenanthe oenanthe | Northern Wheatear | NM | |
| Oenanthe pleschanka | Pied Wheatear | NM | |
| Oenanthe hispanica | Black-eared Wheatear | NM | |
| Oenanthe deserti | Desert Wheatear | NM | |
| Oenanthe bottas | Red-breasted Wheatear | R | |
| Oenanthe isabellina | Isabelline Wheatear | NM | |
| Family Morachidae | | | |
| Batis orlentalis | Grey-headed Batis | R | |
| Family Sylviidae - Warblers | | | |
| Hippolais languida | Upcher's Warbler | R | |
| Sylvietta brachyuran | Northern Sylvietta | R | |
| Spiloptila rufitrons | Red-fronted Warbler | R | |
| Prinia subflava | Tawny-flanked Prinia | R | |
| Spiloptila rufifrons | Red-fronted Warbler | R | |
| Camaroptera simplex | Grey Wren Warbler | R | SM |
| Family Muscicapidae - Flycatchers | | | |
| Bradornis microrhynchus | Grey Flycatcher | R | SM |
| Melaenornis edolioides | Northern Black Flycatcher | R | |
| Family Platysteiridae - Batis | | | |
| Batis orientalis | Grey-headed Batis | R | |
| Family Monarchidae - Monarch Flycatchers | | | |
| Terpsiphone viridis | African Paradise Monarch | AM | |
| Family Timallidae - Babblers | Pallid Flycatcher | R | |
| Turdoides leucopygius | White-rumped Babbler | R | SM |
| Turdoides rubiginosus | Rufous Chatterer | R | SM |
| Family Paridae | | | |
| Parus afer | Northern Grey Tit | R | SM |
| Family Nectariniidae - Sunbirds | | | |
| Nectarinia venusta | Variable Sunbird | R | |
| Nectarinia mariquensis | Mariqua Sunbird | R | |
| Nectarinia habessinica | Shining Sunbird | R | SM |
| Nectarinia famosa | Scarlet-tufted Malachite Sunbird | R | |
| Family Zosteropidae - White-eyes | | | |
| Zosterops abyssinica | Abyssinian White-eye | R | SM |
| Family Oriolidae - Orioles | | | |

| Order/Family | English Name | Status | Biome/Threat Level |
|---|---|---|---|
| Oriolus larvatus | Eastern Black-headed Oriole | R | |
| Family Laniidae | | | |
| *Lanius isabellinus* | Red-tailed Shrike | NM | |
| *Lanius excubitor* | Great Grey Shrike | NM | |
| *Lanius collaris* | Common Fiscal | R | |
| *Lanius nubicus* | Nubian Shrike | NM | |
| *Eurocephalus rueppelli* | White-rumped Helmet-shrike | R | |
| Family *Malaconotidae* | | | |
| *Dryoscopus gambensis* | Northern Puffbach | R | |
| *Tchagra minuta* | Black-crowned Tchagra | R | |
| *Rhodophoneus cruentus* | Rosy-Patched Bush-Shrike | R | SM |
| *Laniarius aethiopicus* | Tropical Boubou | R | |
| Laniarius funebris | Slate-coloured Boubou | R | |
| *Malaconotus blanchoti* | Grey-headed Bush-shrike | R | |
| Family *Prionopidae* | | | |
| Prionops plumata | White Helmet Shrike | | |
| Family Corvidae - Crows, Ravens | | | |
| Corvus albus | Pied Crow | R | |
| Corvus capensis | Black Crow | R | |
| Corvus rhipidurus | Fen-tailed Raven | R | |
| Family Sturnidae - Starlings | | | |
| Onychognathus morio | Red-winged Starling | R | |
| Onychognathus salvadorii | Bristle-crowned Starling | R | SM |
| Lamprotornis chalybaeus | Blue-eared Glossy Starling | R | |
| Lamprotornis purpuropterus | Rueppell's Long-tailed Starling | R | |
| Spreo superbus | Superb Starling | R | |
| Cosmopsarus reglus | Golden-breasted Starling | R | |
| Cinnyricinclus leucogaster | Violet-backed Starling | R | |
| Creatophora cinerea | Wattled Starling | AM | |
| Family Passeridae - Sparrows | | | |
| *Passer griseus* | Grey-headed Sparrow | R | |
| *Petronia pyrgita* | Yellow-spotted Petronia | R | |
| Family Ploceidae - Weavers | | | |
| Bubalornis niger | Red-billed Buffalo Weaver | R | |
| Plocepasser mahall | White-browed Sparrow Weaver | R | |
| Dinemellia dinemellia | White-headed Buffalo Weaver | R | SM |
| Ploceus baglafecht | Baglafecht Weaver | R | AH |
| Ploceus cucullatus | Black-headed Weaver | R | |
| Ploceus intermedius | Lesser Masked Weaver | R | |
| Ploceus rubiginosus | Chestnut Weaver | AM | |
| Anaplectes rubriceps | Red-headed Weaver | R | |
| Quelea quelia | Red-billed Quelea | AM | |
| Euplectes hordeaceus | Southern Red Bishop | R | |
| Family Estriididae - Whydahs, Waxbills | | | |
| Pytilia afra | Orange-winged Pytilia | R | |
| Pytelia phoenicoptera | Red-winged Pytilia | R | |
| Lagonossticta senegala | Red-billed Firefinch | R | |
| Uraeginthus lanthinogaster | Purple Grenadier | R | SM |
| Uraeginthus bengalus | Red-cheeked Cordon-Blue | R | |
| Estriida rhodopyga | Crimson-rumped Waxbill | R | |
| Estriida charmosyna | Black-cheeked Waxbill | R | |
| Family Fringillidae - Finches | | | |

| Order/Family | English Name | Status | Biome/ Threat Level |
|---|---|---|---|
| Serinus leucopygius | White-rumped Serin | R | |
| Serinus atrogularis | Yellow-rumped Serin | R | |
| Serinus canicollis | Yellow-crowned Canary | R | |
| Serinus xantholaema | Salvadori's Serin | E | SM, NT |
| Serinus donaldsoni | Grosbeak Serin | R | |
| Family Emberizidae | | | |
| Emberiza tahapisi | Cinnamon-breasted Rock Bunting | R | |
| | Somali Golden-breasted Bunting | R | SM |

**Key**:  E - Endemic              R – Resident              Nt - Near threatened
         AM - African Migrant      NM - Northern Migrant     V - Vulnerable
         AH - Afrotropical Highland  SM - Somali-Masai

**Appendix 3**. List of woody plants species in BES (After Azene Bekele *et al*., 1993 cited in Zelealem Wodu, 2007). (Note: The list is not exhaustive; it does not include the list of herbs and grasses).

| No. | Scientific Name | Family |
|-----|-----------------|--------|
| 1 | *Abutilon fruticosum* | Malvaceae |
| 2 | *Acacia albida* | Fabaceae |
| 3 | *Acacia brevispica* | Fabaceae |
| 4 | *Acacia bussei* | Fabaceae |
| 5 | *Acacia etabaica* | Fabaceae |
| 6 | *Acacia mellifera* | Fabaceae |
| 7 | *Acacia nilotica* | Fabaceae |
| 8 | *Acacia oerfota* | Fabaceae |
| 9 | *Acacia robusta* | Fabaceae |
| 10 | *Acacia Senegal* | Fabaceae |
| 11 | *Acacia seyal* | Fabaceae |
| 12 | *Acacia tortilis* | Fabaceae |
| 13 | *Acokanthera schimperi* | Apocynaceae |
| 14 | *Allophylus rubifolius* | Sapindaceae |
| 15 | *Asparagus leptocladodius* | Asparagaceae |
| 16 | *Balanites aegyptica* | Balanitaceae |
| 17 | *Balanites glabra* | Balanitaceae |
| 18 | *Bascia minimifolia* | Capparidaceae |
| 19 | *Berchemia discolor* | Rhamnaceae |
| 20 | *Cadaba farinose* | Capparidaceae |
| 21 | *Canthium setiflorum* | Rubiaceae |
| 22 | *Capparis sepiaria* | Capparidaceae |
| 23 | *Capparis tomentosa* | Capparidaceae |
| 24 | *Carissa spinerum* | Apocynaceae |
| 25 | *Combretum molle* | Combretaceae |
| 26 | *Commiphora erythrae* | Burseraceae |
| 27 | *Commiphora schimperi* | Burseraceae |

| No. | Scientific Name | Family |
|-----|-----------------|--------|
| 28 | *Cordia monoica* | Boraginaceae |
| 29 | *Crotalaria laburnifolia* | Fabaceae |
| 30 | *Dichrostachys cinerea* | Fabaceae |
| 31 | *Dodonoea angustifolia* | Sapindaceae |
| 32 | *Euclea schimperi* | Ebenaceae |
| 33 | *Flueggea virosa* | Euphorbiaceae |
| 34 | *Grewia bicolor* | Tiliaceae |
| 35 | *Grewia erythrea* | Tiliaceae |
| 36 | *Grewia flavescens* | Tiliaceae |
| 37 | *Grewia kakothamos* | Tiliaceae |
| 38 | *Grewia villosa* | Tiliaceae |
| 39 | *Jasminum floribundum* | Oleaceae |
| 40 | *Justcia schimperiana* | Acanthaceae |
| 41 | *Kleinia squarrosa* | Acanthaceae |
| 42 | *Lanthana camara* | Verbenaceae |
| 43 | *Melhania velutina* | Sterculariaceae |
| 44 | *Oncoba spinosa* | Flacourtiaceae |
| 45 | *Opuntia ficus-indica* | Cactaceae |
| 46 | *Prosopis juliflora* | Fabaceae |
| 47 | *Rhus natalensis* | Anacardiaceae |
| 48 | *Salvadora persica* | Salvadoraceae |
| 49 | *Senna obusifolia* | Fabaceae |
| 50 | *Steganotaenia araliacea* | Apiaceae |
| 51 | *Sterculia Africana* | Sterculiaceae |
| 52 | *Tamarindus indica* | Fabaceae |
| 53 | *Terminalia brownie* | Combretaceae |
| 54 | *Trachilia emetica* | Meliaceae |
| 55 | *Ziziphus spina-christi* | Rhamnaceae |

**Appendix 4.** Boundary description of the proposed national park.

Based on 1:250,000 topographic maps and high resolution Google Earth images, the new boundary description of the park will be as follows:

**NB.** The boundary was decided based on discussion with local residents and other stakeholders at regional, zonal and district level. Thus, the boundary does not necessarily follow natural land features, rivers and roads to join the beacons.

1. Commencing at Beacon No. 1 on the bank of Anud River in *Rike Guda Village* with coordinates of 8.26643N and 42.02313E. The boundary runs southeast to beacon No, 43 at the junction of the Anud River to the Gobele River Valley. It runs towards the north along the West of the Anud river Valley to the beacon at Jido Misra. **This beacon was demarcated based on satellite imagery and topographic maps due to security reasons.**

2. Thence in a generally northerly direction to Beacon No. 2 at *Jido Misra Village, which is* the most southeastern limit of Meyu Muluke District and borders Rike Guda Village of Meyu-Somali District in the south. The beacon site was located east of Goro Tere locality facing to Gobele Valley to the east. The coordinates are 8.47944N and 42.00417E at an altitude of 1,236 m a.s.l. Here, connects the beacons at Mt. Mujulo of Muluke Village in the northwest and an imaginary beacon in Rike Guda Village in the southeast.

3. Thence in a generally northerly direction to Beacon *No 3 at Muluke Village which is* situated south of Mujulo Mountain between Jido Misra Village ,,,,, beacon on Mt. Mujulo that connects the beacons at Gebibda in the north and the beacon at Jido Misra Village in the southeast in the northerly direction to Beacon No. 4 at coordinates of 8.65436N and 41.94622E with an altitude of 1,359 m a.s.l at *Gebibda Village* - This village is bounded by Babile ES in the east, Alola in the north and Muluke Village in the south.

This boundary line joins the beacons at Alola in the north and Gara Mujulo of Muluke Village in the south.

4. Thence Beacon No. 5 *Alola Village* - Alola is the northeastern limit of Meyu Muluke District that borders Babile Sanctuary to the east and Girawa District in the north. A beacon had to be set, the fix was located nearby a narrow vehicle track at Rasa Harmuko locality, about 500 m east of a small village of Burtulo, with coordinates of 8.81333N and 41.96667E at an altitude of 1,410 m a.s.l. This beacon connects the beacons at Gebibda Village in the south and Hufe Village in the north. The vegetation here is dominated by *Commiphora* woodland

5. Thence moving further north to Beacon No. 6 at *Tutu Jenta (Hufe) Village* – This village is the last to delimit Girawa District in the southeast bordering Meyu Muluke District. Hufe is situated on the plain gently descended to Gobele Valley, with coordinates 8.93528N and 41.98130E at an altitude of 1,395 m a.s.l. The beacon here faces to Gobele Valley and joins the beacons at Mudena Jiru Belina in the north and Alola Village in the south.

6. Thence continuing to north to Beacon No. 7 at *Mudena Jiru Belina Village* - This village is located in the lowland of Mudena Valley next to Jima Bero in the north, Hufe in the south and Gobele Valley in the east with coordinates at 9.01195N and 41.97030E at an altitude of 1,232 m a.s.l. The beacon was demarcated nearby Melka Adere locality facing to Gobele Valley to the east.

7. Thence moving further north to *Jima Bero (Rasa Negaya)* Village joins to Beacon No. 8 *Jima bero* village faces Agdura Village of Fedis District to the east crossing Gobele Valley, and bordered by Biftu Village in the north and Mudena Jiru Belina Village in the south. Gobele Valley is the eastern limit of this village. Nearby Yugo locality along the chains of escarpment up the Gobele Valley for about 2 km. The beacon was set at 9.08389N and 41.99389E with an altitude of 1,569 m a.s.l. This

boundary line connects the beacons at Biftu in the north and Mudena Jiru Belina in the south.

8. Thence continuing to generally northerly direction joins to Beacon No. 9 at *Biftu Village.* Biftu is delimited by Gefre River to the north and Gobele River to the east. The boundary was set at Duda Lemicha locality facing towards Gefre River with and coordinates of 9.13112N and 41.97143E with an altitude of 1,667 m a.s.l. The boundary line of this beacon connects the beacons at Dire Gudina in the north and Jima Bero in the south.

9. Thence moving further north to Beacon No. 10m to the site locally called Kerso within *Dire Gudina village* - This is the only village in Kurfa Chele District that borders the Sanctuary in the northwestern corner. It is situated on a high ground between Gobele Valley in the east and Gefre River in the southwest. The agreed beacon to set was on Kerso locality with co ordinations at 9.16350N and 41.97720E and elevation of 1,617 m a.s.l. This fix connects the beacons at Haqefila Village in the northeast and Biftu Village of Girawa District in the south.

10. Thence continuing to northerly direction to Beacon No. 11 at *Haqefila Village* - Located northwest of the beacon at Edo Belina Village, it faces to Gobele Valley to the west. This village borders the last village, Dire Gudina of Kurfa Chele District in the west. () at Kelala Gende Umer locality with coordinates of 9.20789N and 41.97387E at an elevation of 1,772 m a.s.l. Hence, this demarcation connects the beacon at Edo Belina in the southeast and Dire Gudina in the south.

11. Thence turning to southeasterly direction joins Beacon No. 12 at the site locally called Dire Bute at *Belina Village.* This Village is located between Hamaresa and Gobele River Valleys to the southern end of Haromaya District, bordering Umer Kule Village of the Fedis District to the south and Haqefila Village in the north. With coordinates of 9.19414N and 41.99214E with an altitude of 1,614 m a.s.l. The

boundary line connects the beacon at Derayu of Umer Kule Village to the south and the beacon at Haqefila in the north.

12. Thence continuing to southeasterly direction joins to Beacon No. 13 in Umer kule village with geographic measurements of 9.15238N and 42.00752E.close to Haromaya river. Umer Kule is the northern limit of Fedis bordering Haromaya District. This beacon was set on a massive boulder at Hamaresa River Valley bordering Edo Belina Village in Haromaya District from the north.

13. Thence going south to Beacon No. 14 **-** This beacon was set to the western edge of Derayo locality for about 900 m; to the north is Ali Yibro Abo stream for about 100 m; generally it is bound by Gobele and Hamaresa River Valleys. Its geographic measurements are 9.13833N and 42.02000E with an altitude of 1,577 m.

14. Thence continuing in generally southeasterly direction to Beacon No. 15 **-** This beacon was set at Berche locality with GPS measurements 9.11361N and 42.03083N and an elevation of 1,609 m. It is located east of Gobele Valley on top of the high peak, north of Agdura Village and facing to the *Ficus* trees to the south for about 3 km where the Elephants use the place for shade.

15. Thence continuing to south joins to Beacon No. 16 in *Agdura Village* **-** This village is located south of Umer Kule. The first fix (Beacon No. 16) was taken south of the *Ficus* trees on top of the immediate contour line on the high ground escarpment. This point has GPS measurement of 9.08472N and 42.03583E with elevation of 1,543 m. The boundary line goes to the south following the contour line in a zigzag fashion and joins Beacon No, 17.

16. Thence continuing to southeast joins Beacon No. 17, at Adadi Chelo specific site, for 500 m near to Gende Roba. GPS readings for this beacon are at 9.084636N and 42.03582N with altitude of 1,543 m a.s.l. This beacon goes straight to south to join the next fix at Reski Village bordering Agdura near to a small stream.

17.  Thence continuing to south joins Beacon No. 18 at *Reski Village* - The first fix was in the northwestern corner of the village near to Butre locality on top of the escarpment east of Gobele Valley. GPS measurements for this fix were taken from a specific site of Kere Kebena and these read as 9.04000N and 42.03472E with an elevation of 1,535 m a.s.l.

18. Thence continuing south joins to Beacon No. 19 with coordinates of 9.02806N and 42.03361E with elevation of 1,536 m. This beacon was set near to Haro Dembi for about 100 m, and from Gende Jarso locality to the west for about 1.5 km. The line moves straight to south from Beacon No.19 to join the high ground fix in Aneni Village

19. Thenc*e* continuing to southeasterly direction to Beacon No. 20 in locally called kontoma in Aneni *Village*, at coordinates at 8.98556N and 42.04750E with elevation of 1,561m.

20. Thence generally southerly direction to Beacon No. 21 at the edge of Gobele escarpment nearby Kecheno settlement. The beacon has coordinates as 8.97194N and 42.03500E with an altitude of 1,474 m.

21. Thence continuing to south easterly direction to Beacon No. 22 at *Qereinsa Village* - The boundary agreed to set was at 8.91790N and 42.07105E with an elevation of 1,358 m a.s.l. being. This boundary line connects the beacon at Aneni to the north at Beacon No. 21 and south to Lencha Village.

22. Thence continuing south to Beacon No. 23 in   *Lencha Village* - beacon in this village at 8.88389N and 42.07533E with an altitude of 1,335 m a.s.l. and it is straight south from the Beacon at Qereinsa Village.

23. Thence to Beacon No. 24  *Mudi-Tola Village* south of lencha village- nearby Tulu Sawa settlement with coordinates of 8.72294N and 42.06787E. This boundary line connects beacons at Lencha in the north and at Negaya Midega Village in the south.

24. Thence continuing to southeast direction to Beacon No. 25 at Negaya Midega Village - This village is situated between Mudi Tola and Bilisuma Villages to the southeast and northwest respectively. The locality where the beacon erected was at Gurura with coordinates of 8.66228N and 42.14569E and elevation 1,335 m. *Bilusuma Village* - It is located northeast of Negaya Midega and south of Mudi Bali Villages. Bilusuma faces to the Erer Valley.

25. Thence turning to northeast direction to Beacon No. 26 at locality called Gololka. The GPS location of the locality at Gololka where at 8.81306N and 42.20250E with an altitude of 1,469 m a.s.l.

26. Thence continuing north to Beacon No. 27 at *Mudi Bali* Village - The beacon coordinates were set at 8.88806N and 42.20949E with an altitude of 1,482 m a.s.l. This beacon connects the boundary line to Bilusuma Village in the south and Beyo Weraba in the north. The nearest locality to the west is Kutaye.

27. Thence continuing north to Beacon No. 28, *Beyo Woraba Village* - at Abule locality at 8.92417N and 42.21278E with an altitude of 1,515 m a.s.l. This beacon was east of Abule locality to the Erer side. This boundary line should accommodate the forest area in the north crossing the Eje Weraba Valley. It also connects beacons at Mudi Bali Village to the south and Qufa Bobassa to the north. The nearest locality to this beacon is Kereyu.

28. Thence continuing to northeasterly direction to Beacon No.29 at *Qufa Bobasa* Village - This village is facing to the Erer Valley in the east. GPS readings of 8.98889N and 42.24472E.

29. Thence generally northeast direction to Beacon No. 29 which was set east of Deleta locality for 500 m, in the middle of *Acacia-Commiphora* woodland. This fix connects Bali Weraba Village to the south and Negaya Bobasa to the north.

30. Thence continuing northeasterly direction joins Beacon No. 30 at *Negaya Bobasa Village* - In this village, the last locality at the edge of the Sanctuary facing to the Erer Valley is Ameyti with measurements of 9.02472N and 42.25611E with an elevation of 1,445 m a.s.l. The boundary of this beacon passes following the top of the escarpment facing to the Erer Valley to the east with good visibility of the *Acacia* forest down in the Valley. This point is located north of Beacon No. 29 at Qufa Bobasa and south of Beacon No. 31 at Bidi Bora Village on top of the escarpment.

31. Thence turning to northeast direction to Beacon No. 31 at *Bidi Bora Village* **-** Bidi Bora is the last Village of Fedis District to the east and it is facing to the Erer Valley) was assigned to the edge of the sanctuary. The readings for the Bacon are 9.09807N and 42.22605E with an altitude of 1,581 m.

32. Thence Beacon No. 32 *Erer Ebada Village* - at Eje Koru locality with coordinates of 9.12095N and 42.25228E and an elevation of 1,260 m. The site is referred as. This line connects the beacons at Bidi Bora in the west and Gemechu in the east. *Ebada Gemechu Village* - It is situated west of Erer River. It is also bordered by Erer Ebada to the west and Gemechu Village to the east. As stated in Beacon No. 1 with Erer Ebada Village and as the beacon was a common fix, the detail description has to be shared.

33. Thence turning back to southeast joins Beacon No. 33 at *Gemechu Village* - It is bordered by Ebada Gemechu Village to the west and Tulu Horo Village to the southeast. The beacon was set at 9.11250N and 42.30083E in Qile Bula locality, on the high escarpment of Erer Valley to the east at 1,454 m a.s.l.

34. Thence continuing generally southeast direction to Beacon No. 34 at *Tulu Horo* Village - To the east, this village is the last bordering Babile-Somali District, next to Gemechu to the northwest. The beacon fix agreed was at 9.05269N and 42.33356E at a locality of Kurfa Hasen Ali.

35. Thence generally easterly direction to *Beacon No. 35.* This fix was set 5 km northwest of Biqo Village, the northwestern edge of Babile-Somali District. The site selected to set this beacon is 2 km west of the main road between Biqo and Derer Arba Villages. This line turns $90^o$ to the east from the beacon at Tulu Horo and joins Beacon No. 35 with coordinates 9.05269N and 42.37584E.

36. Thence continuing to southeast to *Beacon No. 36* - The boundary line from Beacon No. 35 goes down to the south by 2 km parallel to the main road Biqo to Dendema Town. The beacon here was established northwest of Dendema Town for about 4 km and 2 km west of the main road. The coordinates for this fix were 8.93193N and 42.39151E.

37. Thence turning east joins *Beacon No. 37.* The boundary line was expected to move with an angle of $90^o$ to the east and crosses the road from Babile to Fiq specifically between Biqo and Dendema. A beacon was erected by the road with Beacon No. 37 with coordinates 8.93193N and 42.40871E.

38. Thence continuing east to *Beacon No. 38* - This beacon was fixed in the Valley floor of Dacata River with Beacon No. 38 and coordinates of 8.93193N and 42.52814E. The fix connects the beacons at the main road between Biqo and Dendema for $180^o$ in the west and Fafum Valley in the east.

39. Thence continuing east to *Beacon No. 39* - The boundary line from Beacon No. 38 at Dacata Valley move straight to the east for a bearing of $180^o$ to Fafum Valley. Beacon No. 39 is established in the valley floor of Fafum River and this connects the beacon at Dacata Valley to the west and further down to Beacon No. 40 for about 92 km south to Fafum Valley. The beacon readings at this point are 8.93193N and 42.78695E.

40. Thence turning southeast direction joins *to Beacon No. 40* - connects the boundary line that comes following Fafum River in the north and the beacon to be fixed in

Dacata Valley for 180$^o$ in the west. GPS location of this fix is 8.22222N and 43.19108E. This beacon is the southeastern corner of the sanctuary bordering Jijiga District in the east and Fiq Zone in the south.

41. Thence turning west to *Beacon No. 41* - The beacon here is located in Dacata Valley of Fiq District with coordinates 8.22222N and 42.67912E. This boundary line connects the beacon at Fafum Valley in the east and Gobele Valley in the west with a straight line bearing 180$^o$.

42. Thence continuing west to *Beacon No. 42* - It is located in Fiq District by the main road that goes to Fiq Town. The GPS location for this beacon is 8.22222N and 42.32264E. This line connects beacons at Dacata Valley in the east and the last beacon in Gobele Valley in the west.

*43.* Thence continuing west to *Beacon No. 43* - It is the last beacon in the southwestern corner of the sanctuary and set at the Junction of Anud and Gobele Rivers. This line comes from Fafum Valley in the east connecting beacons at Fafum and Dacata Rivers and Babile-Fiq Road with a true bearing of 180$^o$ and Beacon No. at Rike Guda. The coordinates for this beacon are 8.22222N and 42.09261E.

**List of coordinates for revised boundary beacons.** In the list, degree decimal coordinates were given to all beacons with respective localities and villages. These are given by villages and districts.

| District | Village | Locality | Beacon No. | y | x | Altitude (m) |
|---|---|---|---|---|---|---|
| Meyu-Somali | Rike Guda | Anod R. | 1 | 8.26643 | 42.02313 | 1,041 |
| | Jido Misra | Goro Tere | 2 | 8.47944 | 42.00417 | 1,230 |
| | Muluke | Mt. Mujulo | 3 | 8.54662 | 41.93983 | 1,503 |
| | Gebibda | Kenso | 4 | 8.65436 | 41.94622 | 1,302 |
| Meyu-Muluke | Alola | Bertolo | 5 | 8.81333 | 41.96667 | 1,227 |
| | Hufe | Malegata | 6 | 8.93528 | 41.98130 | 1,350 |
| | Mudena Jiru Belina | Melka Adere | 7 | 9.01195 | 41.97030 | 1,270 |
| | Jima Bero | Yigo | 8 | 9.08389 | 41.99389 | 1,564 |
| Girawa | Biftu | Leymich | 9 | 9.13112 | 41.97143 | 1,445 |
| Kurfa Chele | Dire Gudina | Kerso | 10 | 9.16350 | 41.97720 | 1,610 |
| | Haqefila | Gende Umer | 11 | 9.20789 | 41.97387 | 1,448 |
| Haremaya | Edo Belina | Dire Bute | 12 | 9.19414 | 41.99214 | 1,632 |
| | Umer Kule | Hamaresa R. | 13 | 9.15238 | 42.00752 | 1,531 |
| | Umer Kule | Derayo | 14 | 9.13833 | 42.02000 | 1,567 |
| | Umer Kule | Berche | 15 | 9.11361 | 42.03083 | 1,586 |
| | Agdura | Ficus trees | 16 | 9.08472 | 42.03583 | 1,557 |
| | Agdura | Adadi Chelo | 17 | 9.084636 | 42.03582 | 1,556 |
| | Riski | Kere Kebena | 18 | 9.04000 | 42.03472 | 1,500 |
| | Riski | Haro Bembi | 19 | 9.02806 | 42.03361 | 1,538 |
| | Aneni | Kontoma | 20 | 8.98556 | 42.04750 | 1,556 |
| Fedis | Aneni | Kecheno | 21 | 8.97194 | 42.03500 | 1,470 |
| | Qereinsa | Keramu | 22 | 8.91790 | 42.07105 | 1,465 |
| | Lencha | Chore Osole | 23 | 8.88389 | 42.07533 | 1,460 |
| | Mudi Tola | Sewa | 24 | 8.72294 | 42.06787 | 1,440 |
| | Negaya Midega | Gurura | 25 | 8.66228 | 42.14569 | 1,314 |
| | Bilusuma | Gololka | 26 | 8.81306 | 42.20250 | 1,448 |
| | Mudi Bali | Dodochi | 27 | 8.88806 | 42.20949 | 1,513 |
| Midega Tola | Beyu Woraba | Abule | 28 | 8.92417 | 42.21278 | 1,525 |

| District | Village | Locality | Beacon No. | y | x | Altitude (m) |
|---|---|---|---|---|---|---|
| Fedis | Qufa Bobasa | Deleta | 29 | 8.98889 | 42.24472 | 1,405 |
| | Negaya Bobasa | Robaelo | 30 | 9.02472 | 42.25611 | 1,421 |
| | Bidi Bora | Sirba | 31 | 9.09807 | 42.22605 | 1,590 |
| Babile-Oromia | Erer Ebada | Eje Qoro | 32 | 9.12095 | 42.25228 | 1,274 |
| | Ibada Gemechu | Eje Qoro | 32 | 9.12095 | 42.25228 | 1,274 |
| | Gemechu | Qele Bula | 33 | 9.11250 | 42.30083 | 1,423 |
| | Tulu Horo | Kufa Hasen | 34 | 9.05269 | 42.33356 | 1,533 |
| Babile-Somali | Biqo | Biqo | 35 | 9.05277 | 42.37584 | 1,415 |
| | Dendema | Dendema | 36 | 8.93193 | 42.39151 | 1,462 |
| | Dendema | Fiq Road | 37 | 8.93193 | 42.40871 | 1,246 |
| | Dakata R. N | Dakata R | 38 | 8.93193 | 42.52814 | 1,185 |
| Jijiga | Fafum R. N | Fafum R | 39 | 8.93193 | 42.78695 | 1,379 |
| | Fafum R.  S | Fafum R | 40 | 8.22222 | 43.19108 | 988 |
| Fiq | Dakata R. S | Dakata S | 41 | 8.22222 | 42.67912 | 883 |
| | Fiq Road S | Fiq S | 42 | 8.22222 | 42.32264 | 1,229 |
| | Gobele R. S | Gobele R. | 43 | 8.22222 | 42.09261 | 743 |

**Appendix 5.** Proposed equipment needs for BES. (Note: The exact number of items will be decided depending on the number of experts and scouts at each outpost, and the number of outposts established.)

| No. | Equipments/Activities | No. of Units |
|---|---|---|
| **I** | **Overall Management** | |
| | 4-Wheel drive vehicles | 3 |
| | Tractor | 1 |
| | Tool boxes (with required tools) | 2 sets |
| | Sign boards | At least 10 |
| | Base radios with solar charger | one for each outposts and the HQs |
| | Walky-talky radio with solar charger | at least one for each patrolling team |
| | VHF Repeater Station | 2 |
| | Fire arms and ammunition | For each scouts |
| | First aid kit | one for each outposts and the HQs |
| | Generator/solar panel | For each outpost |
| | Water pump | as per the number of bore holes |
| | Tables and chairs Office furniture | For management and technical staff 20 |
| | File cabinets | 2 |
| | Office materials – paper tray, stapler, puncher, calculator, etc Stationary | 20 |
| | Cash safe | 1 |
| | Uniforms | For 85 scouts |
| | | |
| **II** | **Survey and monitoring, patrolling, documentation of resources, awareness creation, environmental education, etc** | |
| | Topographic maps (1:50000) | |
| | Computers | 6 |
| | Printer | 6 |
| | Compasses | 5 |
| | Fax machine | 1 |
| | Photocopy machine | 1 |
| | GPS | 5 |
| | Binoculars | 92 |
| | Back bags | 92 |
| | Photo Camera | 2 |
| | Video Camera | 1 |
| | Television and VCR or DVD player | 1 |
| | | |
| **No** | **Equipment/Activities** | **No. of Units** |

| III | **Environmental monitoring** | |
|---|---|---|
| | Rain gauge with measuring cylinder | For each outposts and HQs |
| | Thermometers | For each outposts and HQs |
| | Barometer | For each outposts and HQs |
| | Anemometer | For each outposts and HQs |
| | | |
| IV | **Camping equipment and materials** | |
| | 1 man-tents | 40 |
| | 2 man-tents | 20 |
| | Mess tents | 6 |
| | Tarpaulin | 6 |
| | Sleeping bags | 92 |
| | Mattresses | 92 |
| | Torches | 92 |
| | Kerosene lanterns | For each patrol units and HQs |
| | Cooking utensils (set) | For each patrol units and HQs |
| | Water bottles | 92 |
| | Camp stools | Four for each patrol units and HQs |
| | Camp tables (folding) | One for each patrol units and HQs |
| | Boxes (wooden) | One for each patrol units and HQs |
| | | |
| V | **Firefighting equipment** | For each patrol units and HQs |
| | Shovels | Five  For each patrol units and HQs |
| | Machetes | "    "    "    "    "    " |
| | Pick Axe | "    "    "    "    "    " |
| | Axes | "    "    "    "    "    " |
| | Hoe | "    "    "    "    "    " |
| VI | **Herbarium** | |
| | Cabinet for storing plant specimens | 1 |
| | Plant presses | 1 |
| | Identification Books | The available Flora Volumes |
| | Moth balls | As necessary |
| VII | **Museum** | |
| | Display tables | 4 |
| | Display cabinets (glass) | 2 |
| | | |
| VIII | **Information Centre** | 1 at Harer |
| | | |
| | | |

**Appendix 6.** Proposed manpower needed for BES. (Note: The table indicates the need of manpower at the beginning of implementing this MP).

| No. | Manpower | No. needed |
|-----|----------|------------|
| I | **Professionals** | |
| | Warden | 1 |
| | Assistant Warden | 1 |
| | Botanist | 1 |
| | Zoologist | 1 |
| | Ecologist | 1 |
| | Community service expert | 1 |
| | Wildlife tourism expert | 1 |
| | Wildlife veterinarian | 1 |
| II | **Scouts** | |
| | Chief scouts | 5 |
| | Scouts | 60 |
| | Community scouts | 20 |
| III | **Administrative Staff** | |
| | Administration and finance head | 1 |
| | General service | 1 |
| | Secretary | 1 |
| | Accountant | 1 |
| | Cashier | 1 |
| | Entrance fee collector | 1 |
| | Purchaser | 1 |
| | Store keeper | 1 |
| | Radio operator | 1 |
| | Archives | 1 |
| | Drivers | 5 |
| | Auto Mechanic | 1 |
| | Guards | 2 |
| | House keeper | 1 |
| | **Total** | **112** |