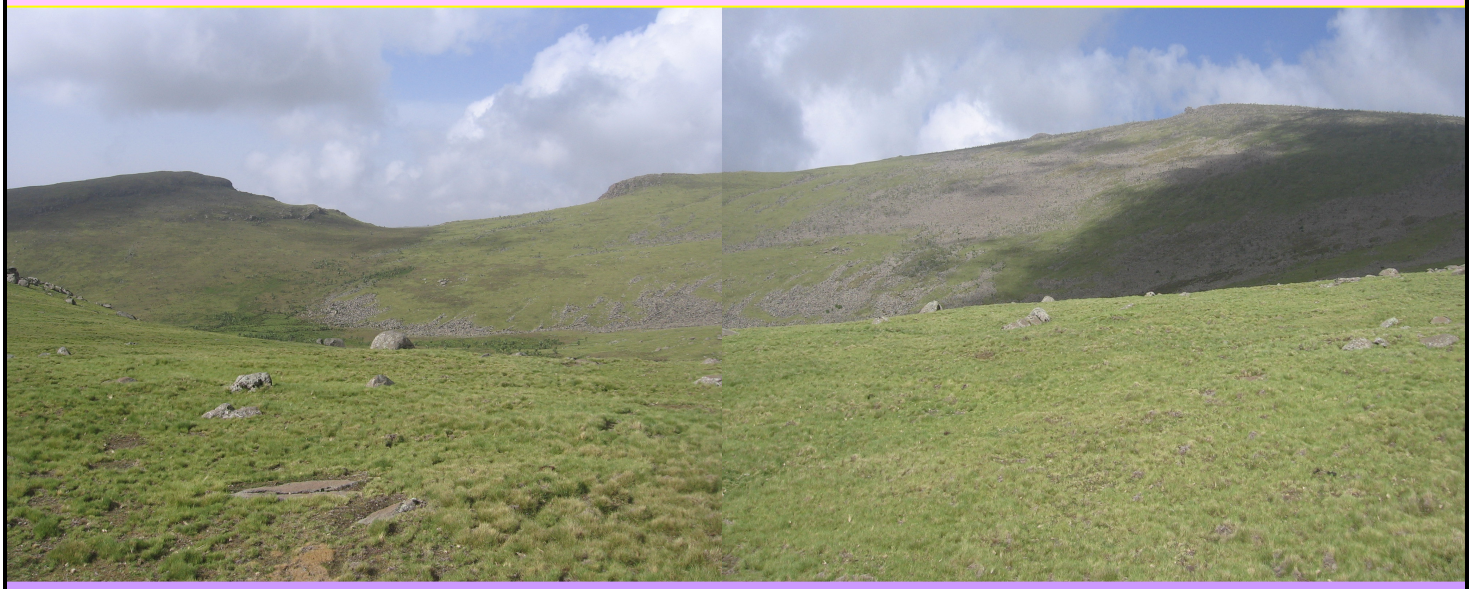
Amhara National Regional State

ORDA, Highland Biodiversity Development Project



Wildlife and Natural Habitats Assessment in Highlands of South Gondar Administration Zone

By

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July 2010 Bahir Dar



Table of Contents ……..……Pages

1. Background and Justification.....1
2. The study area.....3
3. Problem Statement.....4
4. Objectives.....5
4.1 General objective.....5
4.2. Specific objectives.....5
5. Materials and Methods.....5
6. Protected area of Ethiopia and Amhara Region.....6
7. Results and Discussion.....9
7.1 Description natural areas of South Gondar.....9
7.1.1 Alemsaga.....11
7.1.2 Checheho.....14
7.1.3 Genedatemem.....15
7.1.4 Abasayo Monastery.....17
7.1.5 Anechefena.....18
7.1.6 Guza Natural Forest.....20
7.1.7 Guna Mountain.....21
7.2. Topographic and biological resources of South Gondar.....24
7.2.1 Ecosystems and natural habitats.....25
7.2.2. Biodiversity and endemism.....25
2.3. Threats to wildlife and natural habitats.....300
7.4. Root causes to challenges and mitigation approaches.....31
7.4.1 Root Causes and Challenges.....31
7.4.2. Solutions to combat Challenges.....31
8. Major findings.....34
9. Conclusion and recommendations.....35
Preference.....37

Table of figures ……Pages

Fig.1. *Extensive dry ever green montane forest (Alemsaga) and moorlands of Afro alpine ecosystem of (Guna) ……..…….3*
Fig 2. *Typical results of deforestation and loss of top soil ……..……..4*
Fig.3 *Left to right Simien Mountain, Borena Saynt and Alatish National parks ……..…....7*
Fig.4 *Representative Habitats of Menze Guaassa Community Conservation area and Bahir Dar Blue Nile Millennium Park ……..……8*
Fig.5 Mosaic feature and conservation dependent landscapes of South Gondar ……..9
Fig.6. *Landscape and vegetation of Alemsaga natural forest ……..……12*
Fig.7 *Checheho in land bridge and water divide of Tekeze and Abay ……...14*
Fig.8 *The remnant olea dominated huge trees in Gendatemem ……15*
Fig.9 *Natural landscape of Abasayo Monastry ……..……..17*
Fig10 *Anchefena Natural vegetation and landmarks ……..……19*
Fig.11*. Hill top remnant forest of Guza ……..……20*
Fig.12 *Extensive moorland of Guna mountain peak ……..21*
Fig.13 Rock Hayrax /*Heterohyrax brucei/ The only abundant mammal in* Rocky habitats of Gunna. *Photo Wikipedia, 2010 and relatively commonly abundant Common jackal on grasslands of Guna Canis aureus ……22*
Fig.14*. Some of Endemic species of small mammals observed ……..……*23
Fig 15. *Different habitats and landscapes in South Gondar……..24*
Fig 16*. Kids and Some of Bird Species observed Ankober Serin, White Winged Cliff Chat and White Collard Pigeon from above to lower respectively ……26*
Fig.17 *Extensively cultivated landscape Damot around the peak and extensive gorge towards Meket from Checheho ……..30*

List of table

Table.1 List of large mammals in sample forest patches and other areas of different parts of South Gondar ……..27
Table 2. Endemic Species of large and small animals 28
Table 3. List, Conservation status and distribution of Endemic Bird species of Ethiopia and Eritrea ……..30
Table.4. Summary of mosaic complex of category, interweaves, biodiversity, threats, effects and conservation measures …………..……33
Reference ……..37

Annex
1.List of Bird Species observed in the study area ……..39

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1. Background and Justification

Ethiopia is located in the horn and tenth largest country in Africa (1,132,895 sq km). Its climatic diversity has given rise to many and varied ecological systems (CSA, 2010 and http://en.wikipedia.org/wiki/Ethiopia). Ethiopia's broad altitudinal range, geological and topographic setup catered diverse biological resources and scenic features. Biodiversity of Ethiopia is indicated by richness of species that display genetic variations. Ecological and economic services provided to human naturally in free of charge through existence values (Abraham Marye *et al*., 2008, UN-WATER/ AP, 2004)

Ethiopia has 4 biomes (Afro Tropical Highland, The Somali-Masai, The Sudan-Guinean Savannah and Sahelian Transitional Biome), 10 vegetation based broad ecosystems, 32 agro ecological zones and 2 hotspots (Horn of Africa Hotspots and Eastern Afro-montane Hotspot) with several biodiversity centers, ecological communities and sub agro ecologies. Moreover, a unique ecosystem is also represented by the Dallol depression which is one of the hottest places in the world in which Ertale, an active volcano, is found and known to be inhabited by a unique biodiversity (Friis and Sebsebe 2001; Zerihun 1999; Sebsebe *et al* 1996; Abraham Marye, 2009; IBDC; 2005, IBDC, 2009).

Ethiopia also has rich wild fauna including 284 mammal (31 or 10% endemic), 861 bird (18 or 2% endemic), 201 reptile (10 or 5% endemic), 188 fish (37 or 20% endemic), 63 amphibian (25 or 39% endemic) and 1,225 arthropod (7 or 0.6% endemic) recorded species. Moreover, out of 201 species of reptiles over 87 snakes, 101 lizards and 13 species of tortoises and turtles (Mohammed *et al*., 2003; Anonymous, 2005; Claire *et al*., 2009; Sebsebe *et al* 1996; IBDC; 2005, IBDC, 2009).

There are between 6500 and 7000 higher plant species of which about 12 percent are endemic (Tewolde Berhan, 1991). The closed and high canopy forest cover of Ethiopia is less than 3 percent. The total number of woody species of Ethiopia is estimated to be 1017, out of which 29 tree species, 93 shrub species and 2 liana species are endemic (Taye *et al*., 2003 , IBDC, 2009). Many of these wildlife resources are declining at an alarming rate due to the wining behavior of human coupled with low level of species and their habitats conservation and rehabilitation effort (Abraham Marye, 2009).

Many natural areas are being used for activities beyond its natural potential and are far from sustaining in its natural process. The matter is more tend to anthropogenic factors dominated by ever increasing winning behavior of human need. MoFED, 2004 report to UN magnified environmental degradation in Ethiopia is closely related to the recurrent of droughts, food insecurity, and declining farm productivity. It is now widely accepted that much of the soil and water loss and land degradation in Ethiopia has to do with the human factor exploiting the environment in an unsustainable manner.

The major threats to the biodiversity of the country are unsustainable utilization of natural resources (over-harvesting), deforestation, and conversion of natural vegetation to farmland, forest fires, habitat loss and fragmentation. All these are related to the root causes of poverty, which are low productivity, lack of alternative viable livelihoods, increasing population pressure and inadequate awareness of economic and tourism values of biological diversity and scenic beauty. Concern on conservation demand, threats and possible solutions identification are not

at required level (IBDC, 2009; Abraham Marye, 2009). Hence, conservation and utilization efforts so far applied are not effective to harness benefits from these resources. Moreover, specific management and conservation demand and respective mitigation measures that can reconcile the use demand of the community and sustainable conservation and use systems are not critically evaluated in many of natural areas.

Amhara National Regional state (ANRS) comprises an area of 159,174sq km with about 17,214,056 populations (CSA 2010) in varied agro climatic zone. It possesses most scenic landscape and biologically fascinating places that ranges from 500 to 4533masl including Ras Dejen highest point of the nation, cultural heritages (ancient monasteries, churches, palaces and artifacts). The Amhara Region encompasses highlands about 73% (greater than 1500masl) and lowlands 27% (less than 1500masl).

The Region has about 450 species of birds and 50 species of larger mammals in 4 legally declared parks, 16 priority forest reserves, 1 community conservation area (Menze Guassa), 3 water basins (Abay, Tekeze and Awash) and 58 rivers, 5 lakes including the largest highland lake (Tana) and upstream source of Blue Nile and its spectacular fall (Tiss Isat). The region is also home to large number of endemic species of Ethiopia. These are 5 (62.5%) large mammals (Walia Ibex, Ethiopian Wolf, Gelada Baboon, Minilik's Bush Back and Spark's Hare), 10 (34.8%) small mammals, 12 (66.6%) bird and variety of fish, reptiles, amphibians and large number of plant species which require detail studies to quantify (Abraham Marye et al, 2010 unpublished).

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A number of endemic wild animals, birds, trees and herbaceous plants are reported to be endangered or critically endangered. Efforts to save some of the wildlife and the vegetation by a number of government institutions, NGOs and public-private partnership initiatives are being made and progress is being achieved. To cite some examples, the conservation status of the Walia ibex has improved from being critically endangered to endangered while on sites where area closure has been applied, rehabilitation of the land has occurred and restoration of species which were on the point of local extinction have been reverted (IBDC, 2009). These show that participatory management and active conservation programs can revive the biodiversity and natural habitats; however, these alone are far from adequate in the face of the alarming magnitude of the threats. Detail studies integrated and suitable intervention; legal support; concession, reconciling traditional conservation and use systems with sustainable scientific management and enforcement of laws are paramount issues.

In Amahara region there are areas that had been studied, under study and many areas not studied in respect to wildlife and their habitats diversity, condition and management. This study was designed with strong commitment done by ORDA. It is fully supported in financial, technical and human resource by High Land Biodiversity Development Project. Hence, this study on wild animal diversity and their habitats in the highlands of South Gondar dealing on more specific to habitat loss, community intervention and suitable management system as a vital issue that should be executed before any management intervention to mitigate loss of

biological diversity and their habitats. This will leads to protect local extinction and destruction of wild animal natural habitats and help to develop effective and sustainable conservation and utilization of wild animals in various natural forest patches and habitats in the zone. Furthermore, it insures integrated ecological and environmental components sustainability that will retain in natural status.

2. The study area

South Gondar Administrative zone situated in the Amhara region covers 14,338 sq. km 2,047,206 population with 143 people per sq. km (CSA, 2010). The altitude of South Gondar ranges from about 1000-4200masl in the lowlands around Tekeze valley and high lands of Guna mountains which comprise warm to cold climate. This shows existence of various species of wild animals which could be protected and sustainable used. The zone has also an important natural areas that represent high altitude biological resources inhabiting sites with significant number of wild animals and endemic species that require detail study on diversity and suitable management.



Fig.1. Extensive dry ever green montane forest (Alemsaga) and moorlands of Afro alpine ecosystem of (Guna)

This rapid ecological assessment was excuted to identifify wildlie and associated resources and management in highland (about 2000-4200masl) representative natural forest patches in three Woredas such as Farta (Alemsaga, Absayo and Guna), Laygayint (Checheho, Guza and Guna) and Merab Estie (Gendatemem, Anchefena and Guna) of South Gondar. These sampled areas categorized in threes altitudinal ranges in the highlands of South Gondar as low /Woyinadega/ 2000-2700 (Alemsaga, Checheho and Gendatemem), mid /Dega/ 2700-3500 (Anchefena, Absayo and Guza) and high /Wurch/ greater than 3500 (Guna mountain range in each Woreda side) at a range of 700m from Dry Evergreen Montane to Moorland of Afroalpine ecosystems of Guna mountain..

3. Problem Statement



Fig 2. *Typical results of deforestation and loss of top soil*

Different studies indicated that all natural vegetation types of Ethiopia are under severe threat. The highest pressure, however, is being exerted on the moist and dry evergreen montane forests which are mainly located in the densely populated highlands, as evidenced by the high rate of deforestation. The long aged use of plants for fuel, construction, farm tools and traditional furniture coupled with complete removal form their habitats for cultivation, settlement and infrastructure development seriously reduced wildlife and indigenous plant species number and cover extent (Abraham Marye, 2009). Ethiopia loses about 141,000 hectares of natural forest each year due to firewood collection, conversion to farmland, overgrazing, and use of forest wood for building materials. For instance, between 1990 and 2005, Ethiopia lost 14.0% of its forest cover, or around 2,114,000 hectares (MONGABAY. 200* http://www.mongabay.com/, 2008).

The natural vegetation of South Gondar restricted in the highlands greater than 2000masl where represented by Afro and Sub Afro alpine vegetation and in small portion in the montane vegetation forest reserve. For instance, the natural habitats in South Gondar Taragedam, Fachin, Zafnegus, Alemsaga, Abasayo, Checheho, Guna, Tekeze valley and Anchefena are few to mention.

These natural areas are not either protected or properly used as they have no quickly defined owner and subjected to unrestricted free overgrazing, cultivation, settlement, illegal hunting and deforestation. Similarly, different forest patches in the high lands of South Gondar Zone wild animals and natural habitats has been deteriorated and fragmented. Moreover, the extent of naturalness and inhibiting wild animals and indigenous plants are not studied in detail and suitable rehabilitation and regeneration mechanisms are not developed.

Still we are not out of time since we have many and fragmented natural patches and biodiversity centers that require reconciling natural habitats and wildlife sustainable management with community direct utilization demand. This led to magnify ecological, economic and spiritual benefit that we can fetch through sustainable conservation tourism development and to transfer boosting their significant existence value for incoming inhabitants.

4. Objectives

This study was intended to assess and evaluate wild animal and their habitats diversity and management; activities of people on use of biological resources of natural habitatsin the highlands of South Gandar Administration Zone

4.1 General objective

The goal of this mission is to assess wild animal and their habitats weighted against diversity, conservation systems, challenges and possible mitigation measures.

4.2. Specific objectives

The specific objectives include to

- Understand the wild animal diversity in different forest patches
- Obtain information on current conservation activities
- Verify major challenges and threats on wild animals and their threats
- Possible conservation and rehabilitation strategies

5. Materials and Methods

The study was conducted through rapid ecological assessment largely dependat on actual observation and field evaluation. Indirect method of identification of wildlife diversity supported by community witness were used and interaction with natural resources particularly wildlife and their habitas. Different materials such as GPS, digital cameras, Binoculars, Identification guides and existing secondary data were used during data collection. Most importantly, the mission tried to understand the concern of stakeholders including as the local communities and local authorities mainly the zone and ORDA.

The study was targeted to investigate wild animals and their habitats diversity and interaction of local communities on use of theses resources with associated challenges and conservation measures. Relevant secondary and primary data sources were selected discussion with officials on natural resources management at zone level and ORDA Biodiversity High Land Program. On discussion meeting representative patches of natural areas from low, mid and high altitude of the highland areas were selected.

A field visit was carried out to understand the current faunal and their habitats status of the different remnant forest patches. The literatures were reviewed for detailed understanding of species diversity. Natural habitats monitoring and colored picture guide were used to understand, differentiate and decide the future management and governance and management systems based on respective sustainable and accepted some International Union for Conservation of Nature (IUCN) protected area selection criteria. This fieldwork was carried out by Bureau of Culture, Tourism and Parks Development Wildlife Study, Development, Protection and Utilization Department jointly with ORDA High Land Biodiversity Development Project Financial Assistance. The joint mission took place in June, 2010.

Field data collection was carried out making two transect lines that cross the main habitats of the delineated forest patches walking 2-3kllometer/hour for 2 to 3 hour in each forest patches. The transect walk was carried early in the morning from 12:30 to 3:00 A.M listing available species either by direct observation and indirectly identification of foot print, droppings, nesting and breeding sites, den (hole and borrows), resting places and feed remains. The local communities intervened on wild animal species diversity, habitats use and human wildlife conflict. The intended field work was executed in each selected forest patch with local guides and experts from ORDA High land Biodiversity Project of South Gondar.

6. Protected area of Ethiopia and Amhara Region

The majority of the country now falls into one of two Biodiversity Hotspots. Thus, the Ethiopian Highlands comprise over 50% of the Eastern Afromontane Hotspot. Over 40% of the Horn of Africa Hotspot falls within Ethiopia. However, the areas are among the most threatened Hotspots in the world. An estimated 97% of the natural vegetation of Ethiopian Highlands has been lost, with humans having significant impacts on an estimated 95% of the natural vegetation in the Horn of Africa (Lakew Berhanu et al, 2007 and Abraham Marye, 2010 unpublished). In striving to achieve The Convention of Biodiversity's 2010 targets require that Ethiopia is expected to have at least 12 per cent of its total land area aside to protect various representative ecosystems that would thereby protect and conserve the declining population of vegetation and wildlife in the country (IBDC, 2009).

Selection, establishment and proper categorization of protected areas are essential for proper conservation of these biophysical resources. To achieve these international, national, local conservation organizations and even communities are interested to conserve these natural wealth (Chere Enawugaw *et al.,* 2006). Efforts to save some of the wildlife and vegetation by a number of government institutions, NGOs and public-private partnership initiatives are being made and progress is being achieved.

Ethiopia has established several protected areas including 15 National Parks, 4 Sanctuaries, 8 Wildlife Reserves and 18 Controlled Hunting areas during the last 40 years. A total area of 213,464 km^2 of the country's land is dedicated to wildlife conservation (IBDC, 2005; IBDC, 2009). Analysis of field studies witness on the number and size of Protected Areas of Ethiopia reveals that 37 Protected Areas that cover 17.86 per cent of the land mass of the country were established before, while only a few National Parks that comprises 1.19 per cent emerged in the last five years. Now the total coverage of Protected Areas is 19.05 per cent (IBDC, 2009). Moreover, 54 dry evergreen and 29 moist evergreen montane priority forest reserves designated to conserve diverse and biophysical resources (Abraham Marye, 2009; IBDC, 2005). However, as of many studies have shown that only less than 50% of each protected areas are functional for designated protected area category and failed to attain management objectives remaining as "paper protected area". They are threatened with over domestic stock grazing, cultivation, settlement, mineral extraction and deforestation or other uses inimical to sustainability of wildlife and their natural habitats.

The protected area development of Ethiopia (and the extent to which it is threatened) has recently received a little attention and recognition. In this regard increasing number of protected areas in the last five years has been observed. Six National Parks Alatish, Borena Saynt in Amhara, Maze, Chebera-Churchura in SNNPR, Kafta-Sheraro in Tigray, Geralie in

Somali and Menez Guassa Community Conservation Area and Bahir Dar Blue Nile River Millennium Park in Amhara have been established and Alatish, Borena Saynt, Bahir Dar Blue Nile River Millennium Park, Maze, Chebera- Churchura National Parks are benefiting from better management, especially in terms of law enforcement, infrastructure and manpower development (IBDC, 2009, Abraham Marye 2009).

In Amhara Region the importance of preserving those prestigious wildlife resources for economic development is paramount issue. In persuading this, studies and conservation efforts were minimal. The natural forest and wooded vegetation areas comprise 34.46% (5,485,480ha) of the region. Of which 1.69% (92,744ha), 18.96% (1,040, 064ha) and 79.35% (4,352,672ha) are high forest, woodland and shrub land respectively. The region shares 22% (2% of high forest, 4% of woodland and 16% of shrub lands) natural forest and wooded vegetation of Ethiopia (UNEP, 2008). These areas comprise diverse biological resources with significant number of endemic species.

Before 2005, the region had only one legally protected area. Meanwhile, the regional government realized the situation and has been made intensive structural changes and management efforts of the parks and other protected areas. These efforts brought change in some areas to stay in natural status in which the number of protected areas increased from one to four. The protected areas size increased from 13,600 to 327,874 ha and the management status of SMNP also improved.

From natural forest and wooded land vegetation areas of the region only 5.9% (327,874 ha) protected legally by Simien Mountains (41200ha), Alatish (266570ha), Borena Saynt national parks (4375ha), Bahir Dar Blue Nile Millennium Park (4729ha) and Menze Guassa Community Conservation Area (11,000ha) which encompasses about 2.1% of the total area of the region or administered by protected area management offices and benefited from law enforcement and human resources. Of course there are 16 priority forest reserves which may increased total area under protection, but have no legally demarcated boundaries and defined area and more subjected to other uses beyond designated management objectives. As a result from 1997 to 2008 Walia Ibex increased from about 270 to 740, Ethiopian Wolf from 2001-208 boosted from 41 to 84 and Gelada Baboon from 4000 to 15000. The conservation status of the Walia ibex has improved from being critically endangered to endangered level and restoration of species which were on the point of local extinction have been reverted.



Fig.3 Left to right Simien Mountain, Borena Saynt and Alatish National parks

Out of the region's legally protected 327,874 ha about 84% (266570ha) occupied by Alatish National Park in the western lowlands (500-830masl) wooded land vegetation complex. The rest protected areas occupy only about 16% (61,304ha) situated in the highlands greater than 1800masl in which major land degradation and loss of biodiversity are prevalent. At the same time neglected to represent in legally protected area delineation and low attention had been given to biodiversity conservation. To revert the situation efforts have been made recently and significant outputs also seen which requires to sustain in progressive way.



Fig.4 Representative Habitats of Menze Guaassa Community Conservation area and Bahir Dar Blue Nile Millennium Park

To increase number of protected areas of the region a number potential assessment has been conducted on natural areas. Some of them are Wof Washa (North Shewa), Bagussa (Awi), Abune Yosef (North Wollo), Guna (South Gondar), Abay Sheleko (East Gojam), Alzeb (West Gojam Wonberma), Wetlands and dry uplands in the vicinities of Lake Tana. Wof Washa, Bagussa and Lake Tana are at promising level and legalization process has been started. However, indeed many areas, detail studies and conservation are at minimal level. Protected area development programs and participatory biodiversity management approach working with the community are indispensable issues should address as a means to sustain and rehabilitate remnant biological resources of the region.

7. Results and Discussion

7.1 Description natural areas of South Gonda

South Gondar zone has important natural areas that have representative habitats for biological resources (fauna and flora) inhabiting sites of wetlands, dry uplands, scrub, hills, open grasslands and riverine habitats. The watershed that drain to the three water basins (Tekezey, Tana and Abay) and many tributaries with diverse vegetation composition has significant value to support large number of wild animals including endemic species that require detail study on diversity and development of suitable management. Assessment of biological diversity, extensive utilization and biophysical resources degradation believed to be representative mid to high altitude areas of the highland region.



Fig.5 Mosaic feature and conservation dependent landscapes of South Gondar

In South Gondar at different Woredas there are many natural remnant forest patches that cover from half to more than hundreds hectare of land with different habitats and land feature are Alemsaga, Taragedam, Absayo, Fachin, Ambomeda, Zafnegus, Wanzayie, Guna, Lomidur, Checheho, Guza, Gendatemem, Anchefena, Gelawdiwos, Kohar Michele, Navega, Shesher, Muja, Sholacherer, Wuddo, monasteries and many churches, Tekeze gorge that extends from Negela (Abiyarv) in Lay Gaynt to Belessa and Waghumra These areas characterized by fragmented, degraded, scrubbed, rock outcropped, shrub lands, secondary

forest and relatively small portion of dense vegetation with large sized trees, open grasslands and bare lands highly interrupted by different land uses of repeated hillsides cultivation, extensive grazing, communal areas encroached by settlement and extractive use (deforestation and hunting) on interrupted by other within the short distance.

Natural habitats selected for the study in South Gondar are situated in the high lands of Afro Tropical Biome (2000-4200masl). The natural habitats comprised the remnant small portion high forest, woodland, open grassland, wet land, escarpment, valleys and bare river banks vegetation areas that have diverse species of flora and fauna composition. The vegetation cover ranges from small patches of large sized trees to extensive shrub lands and open grasslands in various proportions.

Field evaluation show that natural vegetation patches are left in areas where protected as a forest reserve (Alemsaga, Anchefena, Abasayo, Gendatemem, Fachine etc.), and or areas difficult and inaccessible for cultivation (Checheho, Guza, Hillsides of Guna, Around Tekeze River etc) and areas delineated for other (Church, Monasteries, Plantations, Communal areas etc) uses. However, the large portion of these areas and species composition of wildlife (fauna and Flora) has been deteriorated at alarming rate which calls for immediate action to revert. Currently, even in churches and monasteries only few remnant scattered tries with shrieked area coverage are left. Many of forest reserves are also deforested by hidden hit of selective cutting, removal of ground vegetation, hunting of associated wild animals and uncontrolled grazing.

South Gondar administrative zone landscape comprised by high altitude Guna mountain ridge as an upstream source of many rivers where drain to three basins that are Tana, Tekeze and Abay. Mountain Guna has been serving as source of water in radial flow to surrounding inhabitants and wildlife. The major rivers where commences from the central highlands of Guna mountain are Beshelo, Gumara, Ereb, Gedeba, Zoga with many tributaries. These rivers have been washing fragile top soils of deforested, bare lands and unprotected continuously cultivated areas of their water shade. The effect of erosion has been aggravated by poor soil conservation measures and continuous cultivation of hillsides up to mount Guna around 4000masl.

The progressive water movement in many farm plots causes loss of top soil cover and slides which completely end up with rock outcrop. Due to loss of ground vegetation retention of water as a ground reservoir has been decreased and areas particularly around Wonaka, Emebet Marefiya, Tefmeukiya and Damot (029) that where swampy and marsh are now dried and possible to walk to cross even in rainy season. This effect has been manifested on the life of the community through limited growth of grass for dry season feed, loss of residual moisture for ground sprout development of potato; extended dry spell, frequently interrupted rain pattern and seasonal shortage of water. The people living at the top of the Guna mountain particularly in Damot Kebele are suffer from absence of drinking water in dry season. This will gradually decreases the release of water to feed rivers where commence from Guna mountain.

Reversing the situation requires much financial, material and time costs. In the mean time generation of alternative livelihood for the community is also another issue as they are entirely attached with traditional farming system. What ever the case may be rehabilitation and maintenance of natural situation is paramount issue and all concerned bodies should turn their effort and resources to it.

Amid these threats to natural habitats and wildlife natural areas are home to diverse wild species and rich in endemism. In this Rapid Ecological Assessment (REA) 30 large and 11 small mammals were listed. They exist in different natural habitats of which six (3 large and 3 small mammals) are endemic Large mamamals species are locally endangered and they are at the verge of local extinction as they are very rare and low in number or not seen in the last five years.

The number and species diversity of mammals are different in various forest patches, in this rough assessment the lowest 14 species in Chechecho and highest 26 species in Alemsaga were listed. Among 134 bird species recorded 8 out of 17 endemic birds of Ethiopia and 13 species endemics to Ethiopia and Eriteria. A total of 21 out of 30 endemic species of Ethiopia and Eritrea are recorded in the study area. Hence, if detail study is conducted their number would have been more. On the other hand their number and distribution are small and outside natural forest.

Wildlife and natural habitats management system are beyond conservation and sustainable use. Among various natural areas only Tara Gedam dry evergreen montane forest and Guna dry evergreen montane Afroalpine grassland complex ecosystems are listed as priority forest reserve (IBC, 2005) and Fogera plain wetland ecosystems Important Bird Area (IBA) are situated in the study Zone (EWNHS, 1996). However, control systems of employed field guards are limited to prohibit live plant mass destruction for settlement and cultivation.

The interaction of people with different topographic and physiognomic settings has been observed. In the study areas wildlife and their habitats extractive use and encroachment are major causes to disturbance of climatic condition; natural habitats and biodiversity altering normal natural and ecological settings. This is more prevalent through soil depletion, deforestation and absence of effective rain fall contributed to an alarming decline of productivity of the land. The study areas sample site description, wild animals, challenges and human intervention with possible cope up strategies described as follows which will be extrapolated pertaining to the highlands of the region with few exceptions.

7.1.1 Alemsaga

Alemsaga is one of the forest patches selected in low altitude category (2000-2500masl) in the highlands biodiversity conservation and management study. Alemsaga is situated as ecotone in between two Woredas (Farta and Fogera) connecting low laying wetland of Fogera plain and uplands of Farta interrupted by valleys streams, hills and escarpments. It is located about 90km from Bahirdar via Woreta-Amedber and about 13km west of Debertabor capital of the zone. Geographic location ranges UTM 0385820 to 384170 N latitude and 1317365 to 1317219 E longitudes and altitude ranges from 2100 to 2400masl. Thought it is not registered as a priority forest reserve and important bird area in nation wide it has been protected from cultivation and settlement since many years ago.

Biodiversity and habitats: It is home to diverse remnant vegetation composition and bird species. In this rapid assessment 26 large and small mammals were recorded. Out of 134 species recorded in all sample sites and other areas with in the Zone about 70% were recorded in Alemsaga. Among large mammalsAardvark, Olive Baboon, Vervet Monkey,

Crested Porcupine, African Civet, Ethiopian Dwarf Mongoose, Common Jackal, Common Duiker, Bush pig and Common home rat. Major bird of both conservation dependant and endemic species recorded are Wattled Ibis, Harwood's Francolin, Black-winged Lovebird, Abyssinian Woodpecker, Abyssinian Long claw, Rouget's Rail, Banded Barbet are among endemic species of Ethiopia/Ethiopia and Eritrea and .many common species adaptable to Dry montane forest, shrub and open grassland are also listed including Helmeted Guinea fowl.



Fig.6. Landscape and vegetation of Alemsaga natural forest

The natural vegetation of Alemsaga forest represents Dry Evergreen Montane Forest and woodland complex. It represents a complex system of successions involving extensive ever green upland and riverine forests, shrubs and small to large-sized scattered trees; seasonal dense shrub lands with ground cover vegetation. These highest dry upland areas dominated with mountain chains at the edge of cultivated areas. Alemsaga mixed shrub land have canopies usually dominated by woodland that include species *Acacia abyssinica, Dodonia viscosa, Celtis africana, Croton macrostachyus, Buddleja polystachya, Calpurnia aurea, Capparis tomentosa, Carissa edulis Mytenus ovatus, Albizia schimperiana, Albizia malacophylla, Ximenia americaca* etc with divers composition and structure of plant habit.

Threats and management: Alemsaga natural forest has been not legally protected and subjected to extensive grazing, encroachment and extractive use of natural vegetation and wildlife hunting. Major threats to this forest patch are emanated from human activities, use system and low attention to conservation of diversity vegetation components and wild animals including their habitats. As a result only resistant species to deforestation by re-growth and non selected species for human use and livestock feed have been dominated the cover of secondary vegetation.

Selective cutting and removal of ground vegetation and live braches are prevalent. Hence, feeding and breading sites, vantage points and home ranges for many large wild animals and dense forest and shrub lands have been disturbed and deteriorated and conducive for hunting and chasing. Efforts to conserve forest patche are not far from prevention of aggressive deforestation, settlement and cultivation. Otherwise other uses and hunting with soundless weapons and traps are common targeting to feeding, breeding and resting sites of wild animals. Conservation and management of Alemsaga natural forest patch has been limited to control extensive and extractive live plant deforestation. Moreover, rehabilitation of vegetation is also limited to allowing for secondary growth and enriching with exotic plants before 20 years.

The characteristic feature of Alemsaga shrub lands complex are more or less similar with the evergreen scrub vegetation occurs either as an intact scrub in association with the dry evergreen montane forest or usually as secondary growth after deforestation of the dry evergreen montane forest. Large species of herbivore wild animals are over hunted and birds like Harwood and Scaly francolins are also extensively trapped by the surrounding communities as a source of bush meat.

The surrounding low laying western plain lands of Fogera people extensively grazed and uplands of Fartal in Eastern and Northern part subjected to continuous cultivation with high population pressure. Many of surrounding communities believe with existence of forest and wild animal for extractive use. They believe as it is state forest reserve only conserved to maintain the forest. Exception to hunted Francolin and Helmeted Guinea fowl.other types bird species are available with significant number as the area is situated as ecotone (in between up land and plain wetlands) and left as forest prohibited from extensive cultivation and settlement species adaptable to both ecosystem exist in Alemsaga which require detail study.

Conservation measures: Sustainable conservation and rehabilitation only limited to prevent settlement and cultivation supported with enrichment with exotic species (Eucalyptus, Coprusess and Pines species) before twenty years which is not acceptable in natural forest composition. As a result the forest size, quality, diversity, species natural composition and habitats for wildlife will recover within three to five years to its nearly natural state. Awareness creation on values of natural habitats requires considering to balance use and management conflict as it is found in two Worda (Fogera and Farta). Reconciling community interest and conservation demand of the area is a paramount issue and draws to develop sustainable and dependable rehabilitation options.

To conclude population represents a zone of sedentary cereal-based mixed agriculture for centuries. The forests have diminished due to human interference and replaced by bushlands in most areas. This forest is under severe pressure as a consequence of inhabitants' need for agricultural and grazing land. There is a severe and increasing fuel wood gap in the area, which leads to depletion of standing stock and, hence, further degradation of the remaining forest stands. This is also an ecosystem where livestock density is the highest and exacerbating ecological process.

7.1.2 Checheho

Another natural sample site selected for the study in low altitude category is Checheho which described as both natural and cultural elements. Checheho is found in the eastern edge of Lay Gayint Woreda bordering with Meket of South Gondar and North Wollo Administrative zones respectively. Checheho is a part of geographically known as narrow mountain ridge (Ameba) that divides Tekeze and Abay basins as inland bridge. It is also a cultural site revealed by recently built rock hewn and modern buildings of Checheho Medhaniyalem.

Checheho is located about 185km from Bahirdar via Dberetabor-Gayint to Woldeya and about 10km east of Nefasmeucha capital of Lay Gayint Woreda. It is Located at UTM 0451298 N latitude and 1304588 E longitudes with 2676masl elevation at the hill top of Checheho viewpoint.

Chechehoo has a spectacular land mark to view extensive land mass of Negela to north and Meket in Tekeze basin and to south Beshelo watershed that drain to Abay basin spectacular land masses. The landscapes viewed in all sides of Checheho comprise complex topographic and anthropogenic settings. Up and down mountain ridges interrupted by rivers, cultivated hillsides and scrub lands with scattered settlement of rural villages, biophysical and water conservation structures draw momentary look to visitors and the top point of Checheho magnifies to view all situations of land masses in all direction.

Biodiversity and habitats: Checheho is home to diverse remnant vegetation composition and bird species adaptable to cliffs, hillsides, caves, scrub and rocky habitats and associated vegetation. In this rapid assessment 14 large and small mammals were recorded. The dominants large mammals inhabited in the scrub vegetation and associated rocky are Rock Hyrax, Aardvark, Vervet Monkey, Crested Porcupine, Common Jackal, Ratel etc. The bird species of endemic to Ethiopia Black-winged Lovebird, Abyssinian Woodpecker, Abyssinian Slaty Flycatcher, White-billed Starling, and White-Winged Cliff-Chat association with common species such as Black Kite, Scaly Francolin, Hooded Vulture, Short-tailed Lark, Common Swift, starlings, weavers, crowns etc.



Fig. 7 Checheho in land bridge and water divide of Tekeze and Abay

Checheho natural forest represents Dry Evergreen Montane scrub shrub and woodland complex dominated by rock outcrop. It represents shrubs and large-sized scattered trees with dense hillside shrub vegetation of small proportion. These highest dry upland areas dominated with mountain rock hills scrub and sliding surface boarded with cultivated hillside farming plots. The dominant plant species *Buddleja polystachya, Dodonaea viscose, Dombeya torrida, Olea europaea, Rumex nervusus Osyris quadripartite* are a common stand in a better cover composition. Many of large tree species and multipurpose species are only confided in burial sites and around the church.

Threats and management: Checheho natural forest patch has been limited to control extensive and extractive live plant deforestation due to church and burial site honoring. Selective cutting and removal of ground vegetation and live braches are prevalent in peripheral parts that extremely deteriorated natural forest size. Hence, feeding and breading sites, vantage points and home ranges for many large wild animals and shrub lands have been reduced. Efforts to conserve forest patch are not far roadside plantation before twenty years by exotic species and no natural site to aside for conservation beyond burial site. Hence, conservation and management of wild animals limited to those land uses. Otherwise other uses and hunting with traps are common targeting to feeding, breeding and resting sites of wild animals particularly francolin and Common Dicker. Rehabilitation of vegetation is also limited to area closure for burial and church activities.

Conservation measures: Checheho is conserved and protected from cultivation and settlement due to its natural barriers and inaccessibility. Many of peripheral hillsides are used for cultivation and at the hill top rock hewn and newly modern church buildings situated. Due to existence of church and requirement of keeping natural areas of surrounding hillsides few areas aside as natural scrub shrub vegetation with scattered remnant trees. However, it has been not legally protected and subjected to extensive encroachment for agricultural lands at any spots which could be cultivable. Reversing the situation pertains to area closure, protecting expansion of farmland to natural habitats and expansion of protected natural habitats to have enough home range for existing species. Moreover, enriching degraded vegetation with indigenous species integrating with structural conservation, protecting from grazing can secure sustainability of species having enough home range and feed.

7.1.3 Genedatemem

The third natural sample site in low altitude category in the highland study is Gendatemem situated in Merab Estie Woreda about 110 kilometers east of Bahir Dar via Hamusit-Ambesamie-Arebgebeya. Gendatemem is located UTM 0382330 N latitude and 1288721 E longitudes at altitude 2451masl. It is characterized by different landmarks with slightly elevated from surrounding open areas, It has spectacular land mark with benched stepwise shape. Cliff with top flatlands and rocky rigs covered with old and remnant trees of olea and Junipers with diverse composition of shrubs around ruminant huge tress next to agricultural and settlement areas gradually expanding to main forest remnant huge trees. The natural vegetation and landscape comprises irregular shape due to sever encroachment by expansion of farmlands up to hillsides.



Fig.8 The remnant olea dominated huge trees in Gendatemem

Biodiversity and habitats Gedatemem natural forest is home to different bird species and few burrow animals, carnivores and small mammals in diverse remnant vegetation composition. Birds adaptable to forest, shrub and open areas are frequently observed as they have relatively secured from predators and disturbance with church buildings surrounded by huge different species of trees. 16 mammals were recorded as they are observed by indirect methods and believed to be exist as witnessed by the community, The dominant mammals recorded are Aardvark, Vervet Monkey, Wildcat, Spotted Hyena, Ratel, Crested Porcupine. Birds of highland species endemic to Ethiopia Harwood's Francolin, Black-winged Lovebird, Abyssinian Woodpecker, Abyssinian Long claw, Rouget's Rail association with common species such as Black Kite, Scaly Francolin, Hooded Vulture, Short-tailed Lark, Common Swift, starlings, weavers, crowns etc. Francolins species are extensively hunted and traps made from string are common in many areas with in the forest.

The natural vegetation of Gendatemem forest represents Dry Evergreen Montane Forest and woodland complex dominated by scattered huge trees of Olea capensis and Juniperus procers. It represents shrubs and small to large-sized scattered trees in hillsides. These highest dry upland areas dominated with mountain rock hills, shrub hillsides boarded, narrow and benched land covered with huge trees, hill side dense forest, shrub lands and hillside farming plots.

Threats and management: Selective cutting and removal of ground vegetation and live braches are prevalent in all parts that extremely deteriorated natural forest size. .Hence, feeding and breading sites, vantage points and home ranges for many large wild animals and shrub lands have been reduced and restricted around the church. Efforts to conserve forest patch are not far from to control extensive cutting of live plants during day time. In this rapid ecological monitoring except honoring church and burial site the natural vegetation was aside for conservation. Other part of vegetation and wildlife extremely disturbed no site is free from grazing. Hence, conservation and management of wild animals limited to those land uses. Otherwise other uses and hunting with traps are common targeting to feeding, breeding and resting sites of wild animals particularly Francolin and Common Dicker.. Rehabilitation of vegetation is also limited to area closure for burial and church activities with minimum effort that can not go beyond prohibiting settlement and extensive deforestation.

Conservation measures: Gendatemem is protected from cultivation and settlement since many years ago and it is home to huge remnant vegetation composition and bird species. However, it has been not legally protected and subjected with extensive grazing, encroachment and extractive use of natural vegetation and wildlife hunting. Conservation and management of Gendatemem natural forest patch has been limited to control extensive and extractive live plant deforestation. Selective cutting and removal of ground vegetation and live braches are prevalent. If these threats reverted by area closure, prevention of hunting and overgrazing the natural cover will return soon. Since the forest patch has mother trees of natural cover only protection and enforcement of law and community awareness development are critical to sustain the wildlife resources enhancing soil seed bank and natural habitats of wild animals are paramount issue.

7.1.4 Abasayo *Monastery*



Abasayo monastery natural forest patch situated in Farta Woreda in Maynet Kebele estimated about 125ha coverage including peripheral scrub and shrub lands. It is located UTM 0398574 N latitude and 1298370 E longitudes at altitude around 2600masl at the foot of highland and considered as a river gorge in the mid altitude category (2700-3500masl) for this ecological and biodiversity assessment selected as a representative for mid areas of higher altitude (Dega).

Fig.9 Natural landscape of Abasayo Monastry

Abasayo natural forest had been named as monastery but now no church or monks living inside. As of elders in Maynet village; Abasayo monastery had built by Monk Abasoyo and had covered with intact forest and inaccessible. These witness prevail that monastery and church Tekelehaymanot had built inside. As it had away from human settlement during disaster time or epidemic which may related to Ethiopian History of "Kefu Kene'' Around 1890s low assistance from the surrounding communities for monastery community coupled with inaccessibility to get church services enforced the monastery to leave and the church was build at near by hill top which is now functional.

Biodiversity and habitats Abasyo with exception of its size the natural vegetation represents typical dry ever green montane ecosystem vegetation modified by river system as a moist montane. Its natural forest reviled by riverside and near by dens narrow striped forest boarded by rocky hillsides of ''Sebez Gedel'' and. scrub cultivated areas. Wild animals existing in Abasyo are Olive and GeladaBaboon, Vervet Monkey, Crested Porcupine, Abyssinian Hare, Unstriped Ground Squirrel, Caracal, Common/ Jackal, Gent (faro), Klipspringer, Bushbuck etc and 23 species of large and small mammals were recorded in this rapid assessment. It is very conducive for birds living in different habitats. Forest, cliff, shrub, cultivated and rock hills and natural cave adaptive species exist in Abasayo. Hence, Ethiopian Epauletted Fruit Bat, Unstriped Ground Squirrel coupled with divers bird species Ethiopia Harwood's Francolin, Black-headed Forest Oriole, Yellow fronted parrot, Black-winged Lovebird, Abyssinian Woodpecker, Banded Barbet, Rouget's Rail association with common species such as Black Kite, Scaly Francolin, Hooded Vulture, Short-tailed Lark, Common Swift, starlings, weavers, crowns, seed eaters and honey guides etc.

It comprises complex system of successions involving extensive small to large-sized trees of closed forest encroached with peripheral shrub lands dominated by scrub cultivated farm

plots extended from settlements. As a result it is very limited often difficult to observe wild species of higher animals in fragmented narrow striped and one sided river Semena bank forest patch (incomplete ecosystem forest conservation). The natural habitats described as benched dense riverine forest, step hills, rock outcrop and shrub lands boarder by settlement and cultivation.

The natural vegetation of Abasayo forest represents Dry Evergreen Montane Forest and woodland scrubbed complex ecosystem dominated by large sized trees *Acacia abyssinica*, *Celtis africana Dracaena steudneri*, *Ficus sur*, *Olea europaea*, *Albeza* and *Podocarpus spp* and many shrubs, climbers and herbs as an under growth. It represents shrubs and small to large-sized scattered trees in hillsides. These highest dry upland areas dominated with mountain rock hills boarded with cultivated hillside farming plots.

Threats and management: Selective cutting and extensive grazing of ground vegetation are prevalent and peripheral parts that extremely deteriorated natural forest size. .Hence, feeding and breading sites, vantage points and home ranges for many large wild animals and shrub lands have been reduced. Conservation and rehabilitation efforts only limited to prevent extensive deforestation. The forest is encroached by hunting and selective cutting, settlement, cultivation and overgrazing to confined natural forest below the escarpment. As a result its forest size and quality, diversity, species natural composition, habitats for wildlife has been diminished particularly remnant forest reserve is one side of the river that pertains to have incomplete coverage of ecosystem.

Conservation measures: It has been honored as it is monastery and extensive deforestation inside forest restricted to selective cutting for specific purposes such as farm tools, handles and temporary fences constructions for cultivated crops. However, extensive grazing to all parts of the forest is not prohibited from disturbance of natural habitats. Conservation and habitat management requires preventing fragmentation of natural habitats by cultivation and settlement. Vegetation above the escarpments largely dominated by shrub vegetation with secondary growth partially protected after extractive use. The area needs prohibiting extreme hunting, selective deforestation and overgrazing.

7.1.5 Anechefena

Anchefena is another natural site selected for the study in mid altitude (2700-3500masl) category in this highland biodiversity and conservation assessment. Anchefena natural forest situated in Merab Estie Woreda about five killo meters east of Estie town capital of the Woreda in Anchefena Dabot kebele. Anchefena is Located at UTM 0401910 N latitude and 1286534 E longitudes at Asko Terara hill foot and 3000masl at the hill top of Kuramba viewpoint. It has spectacular rock hills with separate stand that can be used to view all sides of surrounding landmass and dense forest beneath it and Estie town across to west.

Biodiversity and habitats: Anchefena is home to diverse remnant vegetation composition and bird species adaptable to dense highland forest, cliffs, hillsides, caves and separated rock mountains and associated vegetation. In this rapid assessment 20 large and small mammals were recorded (observation and communication with local guide). The dominants large mammals are Bush pig, Rock Hyrax, Aardvark, Vervet Monkey, Crested Porcupine, Common Jackal, Ratel etc. The bird species of endemic to Ethiopia Black-winged Lovebird, Abyssinian



Woodpecker, Abyssinian Slaty Flycatcher, and White-Winged Cliff-Chat association with common species such as Black Kite, Scaly Francolin, Hooded Vulture, Short-tailed Lark, Common Swift, starlings, weavers, crowns, buzzard etc are found..

Fig.10 Anchefena Natural vegetation and landmarks

Anchefena natural forest represents Dry Evergreen Montane forest, scrub and woodland complex.. It represents shrubs and large-sized dense hillside forest vegetation of small proportion. These highest dry upland areas dominated with mountain rock hills with sliding surface boarded with shrub and cultivated areas. The dominant plant species *Myrsine africana* (kechemo), *Nuxia congesta* (Askuwar), *Juniperus procer*a, *Apodytes dimidiate* (Dong), *Buddleja polystachya*, *Dombeya torrida*, *Olea europaea Osyris quadripartite* are a common stand in a better cover composition. Many of large tree species and multipurpose species are only confided in hillsides and burial sites around the church.

Threats and management: Selective cutting and removal of ground vegetation and live braches are prevalent in peripheral parts that extremely deteriorated natural forest size. .Hence, feeding and breading sites, vantage points and home ranges for many large wild animals and shrub lands have been reduced. Efforts to conserve forest patch are not far from controlling extensive tree falling. Hence, conservation and management of wild animals limited to small intact hill foot dense forest patches. Other uses and hunting with traps are common targeting to feeding, breeding and resting sites of wild animals particularly francolin.

Conservation measures: Anchefena is conserved and protected from cultivation and settlement due to its natural barriers and inaccessibility. Many of peripheral hillsides are used for cultivation and settlement at the immediate vicinities of the forest patch that changed areas tree woodland to remnant shrub lands. However, considerable efforts have been done to protect remnant tress and ground vegetation particularly at the hill foot of Asko, Kuramba, Gedayie, Areka and Abshelo Mascha. In these sites the natural intact cover status of vegetation clearly observed. However, their size has been shrinks from its former extent significantly (personal communication with forest Guards). Anchefena natural forest has been not legally protected and subjected with extensive encroachment for agricultural lands at any spots which could be cultivable. However, due to existence of the church and inaccessibility supported with forest guards at least some parts of vegetation cover nearly at natural status. However, habitats and home ranges to wild animals have been extremely reduced, degraded, disturbed by human for fire wood collection, domestic grazing and hunting with string traps.

7.1.6 Guza Natural Forest

The third natural site in mid altitude category in the highland study is Guza forest patch situated in Lay Gayint Woreda at Sheten Shedo Kebele, Guza Gott. Guza forest patch is about 36km far from capital of Lay Gaynt Woreda to the direction of Debretabor after 26 kilometers from Nefas Mewucha meandering to south about 10 kilometers from the main road on the way to Wolela Bahir a rural town bordering Estie, Lay Gayint and Farta Woreda.



Fig. 11. Hill top remnant forest of Guza

Guza forest is located UTM 0422852 N latitude and 1287800 E longitudes at altitude 3136masl at the hill top. It represents high land tress and shrubs small to large-sized at hill top. This highest dry upland on a single rock hills boarded with cultivated lands rounding relatively flat areas the foot of the hill. The natural forest hanged on the top and hillsides of Guza hill intact but small sized natural forest. No deforestation even selective cutting and removal of ground vegetation are prohibited. .Hence, feeding and breading sites, vantage points within small sized forest is secured excepting difficult to satisfy home ranges for large wild animals. The communities believe that cutting of plant parts from natural forest may cause catastrophe on one of family member or domestic stack. The ark Guza Medhaniyalem prohibited collecting any plant part from the forest except for some activities related to church work allowed for removal of leaf from branches.

Biodiversity and habitats The natural vegetation of Guza forest represents dense forest remnants of hillsides in Dry Evergreen Montane Forest and shrub land complex dominated by scattered huge trees of Junipers procera and Erica arborea. The forest patch is small not more than three hector /visual observation/ forest cover and do not has enough space to support population of large mammals adaptable to the area. However, there are a number of indicators on existence hyena, porcupine, rock hyrax, common jackal, francolin, and as of local community witness klipspringer and common dicker are also found. In this assessment 14 small and large mammals were recorded with indirect observation and communication with the community. The bird species White-collared Pigeon, White and Winged cliff-Chat, Black Kite, Hooded Vulture, Common Swift, starlings, weavers, crowns, buzzard etc are found.

Threats and management: Efforts to conserve forest patch are entirely based on beliefs in honoring church and spiritual power of The Ark protecting from any danger. Hence, conservation and management of wild animals limited prohibiting forest extractive use and have no significant conflict between human and wild animals as vermin. Otherwise other uses and hunting with traps are common targeting to feeding, breeding and resting sites of wild animals particularly francolin. Guza is exceptionally protected from deforestation of its core

area but the surrounding area up to the hill foot subjected to continuous cultivation for centuries and the size of natural forest with original cover is confined in the hill top and partially on hillsides.

Conservation measures: There is no significant conflict between wild animals hyena as its den, dropping and foot print mark show there are more number of spotted, striped and aardwolf (personal communication with community), in this narrow home range. Those species of wild animals can observed during day time at the evening but no major conflict to domestic stock. Porcupine is also feeding their potato in the night and protected with stone fence, chasing some times killing during feeding. Only in hunting time at the night both porcupine and hyena search for feed and hunt left over on the roadside and meadow. However, this small sized forest patch may no able to support sustainable way even existing expected number of wild animals. It is also difficult to extend natural vegetation and rehabilitation as many hillsides and surrounding areas extensively cultivated for a long by subsistence farmers. Only option is to maintain existing conservation system to serve as source of seed to collect viable seed.

7.1.7 Guna Mountain

Guna Mountain peaks greater than 3500masl are comprised the higher altitude category. It is delimited by three Woredas as a common known as an upstream source of major rivers that drain to Tekeze, Abay and Tana basins. It is an area of top site of the zone major portion of study sites in three Woredas at higher elevation. The central vast plain area of Guna is located UTM 0418406 N latitude and 1295525 E longitudes at altitude 4232masl.The study areas for this rapid ecological assessment where to the direction of Farta West and North, Lay Gaynt to East and South East and Eastie to West and South West Sides of Guna Mountain. Guna Mountain is covered with extensive moorland dominated by open grassland devoid of shrub and tree plants. Recently shrubs of Erica arborea plant are rehabilitating in Devanalet and Mokash in Estie Woreda side. Eucalyptus around Kmerdengaye rural town in Farta Woreda, natural shrubs in few inaccessible sites under cliff and short tough grassland in top meadow are remnant vegetation that are left.



Guna is situated in the high plateau extending up to mount 4200masl remained as open area with short grass fields of Afro alpine and rock heaps as an up stream source of rivers. The other ecosystem in Guna is Sub Afro Alpine ecosystem that lay 3200-3700masl and its major portion used for cultivation and settlement. Sub-Afro-alpine /Ericaceous moorland/ dominated by Erica arborea and main part of escarpment. Dominant plant species: Erica arborea, Giant lobelia (*Lobelia rhyncopetalum*), Abyssinian Wild Rose (Rosa abyssinica) rarely seen in hill sides and shrubs in homestead.

Fig.12. Extensive moorland of Guna mountain peak

Biodiversity and habitats: As of local community and modified habitats observation in this rapid assessment Guna mountain was habitat for significant number of Gelada Baboon and considerable number of Endemic large mammals Gelada (Theropithecus gelada) tat were about 35 before three years now not more than 15 and Ethiopian wolf (Canis simensis) locally extinct or not seen in the last five years. Abyssinian Hare is also rarely seen in caves, small valleys are left. Ethiopian Wolf has not been seen in the last five years. Vegetation like Giant lobelia is has been seen in very scattered sites near cliffs and patches of small valleys.



Fig 13. Rock Hayrax /*Heterohyrax brucei/ The only abundant mammal in* Rocky habitats of Gunna. *Photo Wikipedia, 2010 and relatively commonly abundant Common jackal on grasslands of Guna Canis aureus*

Though larger species and their natural habitats degraded still there are species in remnant patches of grasslands, rocky and plantation forest patches. Particularly these adaptable to rocky habitats, cave and den are still significant number of species is available. Rock Hyrax, Crested Porcupine, Spotted Hyena Golden/ Common/ Jackal, Common Duiker, Klipspringer , Common and Harrington's Rat are present in their respective habitats. The endemic species of small mammals Unstriped grass rat (*Arvicanthis abyssinicus*), White-footed rat (*Praomys albipes*), Harsh-furred rat (*Lophuromys flavopunctatus*) and different species of home and common mole rat (*Tachyoryctes splendens*).
Major bird species recorded are Black-headed siskin (*Serinus nigriceps*), Ankober serin (*Serinus ankoberensis*), Abyssinian longclaw (*Macronyx flavicollis*), Spot-breasted plover (*Vanellus melanocephalus)* and common endemic species with Eritrea Blue-winged Goosex (Cyanochen cyanopterus), Thick-billed Raven (*Corvus crassirostris*), White-collared pigeon (*Columba albitorques*) and other many species recorded.

The Guna highland comprises Sub Afro alpine and Afro alpine ecosystem dominated by moorland vegetation extremely devastated. Majority of habitats are open grassland. Rock heaped and hillside, scattered and slightly rose from surrounding, hills covered with open grassland, shrub land dominated by Erica arborea with scattered Giant lobelia. Most of Guna mountain landmass is above tree line (greater 3700masl or timber line characterized by open grass land. The water shed drains to all direction as a main water source for rivers join to Abay, Tekeze and Tana..



Arvicanthis abyssinicas
Unstripped Grass Rat

Crocidura baileyi
White toothed Rat

Myomys albipes
Soft-furred Rat

Fig. 14. Some of Endemic species of small mammals observed

Threats and management: The top plain area covered with Festuca Spp remnant as ground cover and water pond that lasts for about ten months extensively deteriorated. The top of Guna Mountain remained as vast area of open grassland in which other vegetation type only confined in hillside as a ruminant stumps or at the foot of hills. Guna highland extensive grassland is seriously affected by domestic overgrazing and encroachment with continuous expansion of cultivated farmlands and settlement up to above 4000masl. The communities living in the highest peak are suffer from absence of water in the dry season (April to May) and decreasing productivity of the only crops grown that are Irish potato and six raw barley. Extensive large area of grazing fields of Guna are not satisfying the feed demand of the domestic stock as it is extensively overgrazed and habitats with naturally grown Giant Lobelia and Erica arborea are nearly at the verge of local extinction.

Conservation measures: No conservation measures have been enforced. Pressure has been exerted on natural habitats and wildlife in all direction are overgrazing on extensive large area of Moorland and continuous encroachment ever moving upward cultivation and settlement. As of the local community areas that were not used for cultivation due to frost and cold weather in some years ago are now cultivated to grow. Similarly areas where wetland as a marsh and boggy area that were used for drinking domestic stock and not crossed in summer is now vanished, .can able to walk on, the areas left with stuffed with hard, short and non palatable grass field and dry soil with no moisture in the last five years. Reversing these threats by any means is a paramount importance.

The possible way to conserve wildlife and natural habitats of Guna Mountain is delineating natural habitats and possible alternative solutions for overgrazing, unwise use of communal land and illegally cultivated and settlement areas. Awareness development to the local community on the value of Guna natural ecosystem conservation to other livelihood activities for existing and incoming inhabitants of around Guna is a paramount issue. Participatory conservation, management activities and plan development involving respective stakeholders. Developments of community bylaws and sustainable use systems that guarantee to rehabilitate wildlife and natural habitats of Guna have to be established to protect illegal anthropogenic acts. Lastly implementation and monitoring plan with respective manpower and facilities that should be respected and shares accountability with expected equitable. After implementing these within the next three to five years Guna can be an important fragile Afro alpine conservation area managed by its own protected area management office as of Simien

Mountains National Park and Borena Saynt National Park. Efforts to mobilize the community and reconciling conservation and utilization demands of the community is a vital issue requires due attention.

7.2. Topographic and biological resources of South Gondar

As Amhara region is one of important biodiversity center and spectacular land feature that attracts visitors since long ago. South Gondar is one of important areas of the region endowed with spectacular landmarks and endemic fauna and flora. South Gondar's complex topography with marvelous afro-alpine and montane habitats has had a thoughtful effect on the evolution, composition and distribution of wild fauna. Such ecological variability has contributed to the abundance of diverse groups of terrestrial wild fauna, making the area an important area of diversity and endemism.



Fig 15. Different habitats and landscapes in South Gondar

Its impressive highland with associated Lake Tana as an up stream source of Blue Nile, colorful avian fauna and extensive endless wetland masses of Fogera plain and Guna mountain ridges, separately standing rock pillar hills, valleys and open grassland interrupted by rivers and hillsides are some of natural setting that create momentary look to visitors. The water divides of landmass with narrow ridges are topographically describes unique geographic feature. The area in which the tributaries river water shades that drains to Tana, Tekeze and Abay basin start are impressive to viewers with their fascinating landscape, seasonal color and cover changes. The area is also comprise wide altitudinal variation that extends above 3000m range as the area is laid within about 1000-4200masl from Tekeze to Gunna mountain ridges where create conducive natural environment for diverse species of flora and fauna.

7.2.1 Ecosystems and natural habitats

Though the study sites are potential places represented within the known ecosystems of the country there are other sites that are not fully represented. Some of such sites are Fogera plain as an important bird area and Tekeze basin riverine lowland diversity; Fachin acacia dominated secondary forest; Taragedam monastery with old aged remnant huge forest and many extensive shrub land and communal areas. These potential forest resources of the zone have long been identified as communal and priority forest and important bird area, they still remain not assessed. However, it is believed that these areas devote for the conservation of a wide diversity of animal species and variation in forests is dependent on maintaining essential functional components of the ecosystem. In this regard South Gondar is endowed with wetlands of various forms and vast water resources in Fogera, Dera and Lobokemkem. Dry Montane forests of all sample sites, Fchine and Gelawdiwos and Moorlands of Guna Mountain ridges, which are home to a variety of wild animals that requires further detail studies on diversity and management options that can sustain and rehabilitate threatened species and natural habitats.

The main represented areas are Guna and Alemsaga as priority forest reserve areas, representing all sorts of habitats, but notably seasonal wetlands of different natures, forests, bushes/scrub lands, mountains and grasslands of its vicinities and highland forest patches such as Abasayo, Anchefena, Guza, Checheho and Gendatemem. South Gondar is mainly known by Guna highland as an up stream source of rivers that drains to Tekeze, Abay and Tana basins. It also comprises different landmass with spectacular features of various natural ecosystems. These are Afro alpine and Sub Afroalpine, Dry Evergreen Montane Shrub and Grassland Complex, Wetlands, Combretum Trminalia Woodland and Scrub and Semi Deciduous Ecosystems. Only Afro alpine and Sub Afroalpine, Dry Evergreen Montane Shrub and Grassland Complex and Seasonal Wetland ecosystems situated in the highland are represented in this study. These ecosystems comprised different habitats such as Moorland open grassland, Afro alpine rock heap, hill with scrub rock outcrops, scattered rock hills, narrow strip dens forest patch, shrub land with scattered trees, riverine, seasonal wetlands, marsh areas dominated by connected mountain ridge landmass with associated lowlands.

7.2.2. Biodiversity and endemism

Highlands of South Gondar is also endowed with diverse species of wild mammalian fauna. The diversity is highly magnificent in rodents, primates and carnivores. In this study a total of 41 species of large and small mammals belonging to 18 Families have been recorded. Six of these are endemic species, and are almost exclusively confined to the Guna highlands plateau and associated forest patches. Three of the endemics, namely: Ethiopian Wolf (locally extinct), Gelada Baboon (only about 15 individuals) and Stack's Hare (rarely seen) are grouped under large mammals while the remaining three of the endemic species that are rapidly identified are small mammals with serious concern of conservation action.









Like that of the mammals, diversity of avian species of South Gondar is rich as recorded in this study it harbors 134 species. This is about 16% of the total Birds of Ethiopia are grouped into 45 Families. Of these, 8 species are endemic to Ethiopia, while 13 other species are found only in Ethiopia and Eritrea.

Fig 16. Kids and Some of Bird Species observed Ankober Serin, White Winged Cliff Chat and White Collard Pigeon from above to lower respectively

Table.1 List of large mammals in sample forest patches and other areas of different parts of South Gondar

No	Common name	Scientific name	Family	C0nservation Status	Distribution in sampled forest patches and outside sampled site							
					Al	CH	GE	AB	AN	GUZ	GU	Outside study site
1	Aardvark	*Orycteropus afer*	Orycteropodidae	LC	X	X	X	X	X	/	X	X
2	Rock Hyrax	*Heterohyrax brucei*	Procaviidae	LC	X	X	X	X	X	X	X	X
3	Olive Baboon	*Papio anubis*	Cercopithecidae	LR/lc	X	/	/	/	/	/	/	X
4	Hamadryas Baboon	*Papio hamadryas*	Cercopithecidae	LR/nt	/	/	/	/	/	/	/	X
5	Gelada	*Theropithecus gelada*	Cercopithecidae	LR/nt	/	/	/	X	/	/	X	/
6	ColobusMantled Guereza	*Colobus guereza*	Cercopithecidae	LR/lc	/	/	/	/	/	/	/	X
7	Vervet Monkey	*Cercopithecus aethiops*	Cercopithecidae	LR/lc	X	X	X	X	X	X	/	/
8	Crested Porcupine	*Hystrix cristata*	Hystricidae	LC	X	X	X	X	X	X	/	X
9	Unstriped Ground Squirrel	*Xerus rutilus*	Sciuridae	LC	X	/	/	X	X	X	/	X
10	Abyssinian Hare	*Lepus habessinicus*	Leporidae	LR/lc	/	/	/	X	X	X	/	X
11	Ethiopian Highland Hare	*Lepus starcki*	Leporidae	LR/lc	/	/	/	/	/	/	/	X
12	Fruit Bat	*Epomophorus labiatus*	Pteropodidae	LC	X	X	/	X	X	/	/	X
13	Caracal	*Caracal caracal*	Felidae	LC	X	/	/	X	X	/	/	X
14	Wild cat	*Felis silvestris*	Felidae	LC	X	/	X	X	X	X	X	X
15	Serval cat	*Leptailurus serval*	Felidae	LC	X	/	X	X	X	/	/	X
16	Leopard	*Panthera pardus*	Felidae	LC	X	/	/	/	/	/	/	X
17	African Civet	*Civettictis civetta*	Viverridae	LR/lc	**X**	/	/	/	/	/	/	X
19	Spotted Hyena	*Crocuta crocuta*	Hyaenidae	LR/cd	X	X	X	X	X	X	X	X
19	Striped Hyena	*Hyaena hyaena*	Hyaenidae	LR/nt	X	/	/	/	/	X	X	X
20	Aardwolf	*Proteles cristatus*	Hyaenidae	LR/lc	X	/	/	/	/	X	/	X
21	Golden/ Common/ Jackal	*Canis aureus*	Canidae	LC	X	X	X	X	X	X	X	X
22	Ethiopian Wolf	*Canis simensis*	Canidae	EN	/	/	/	/	/	/	X	X
23	Ratel (Megoza)	*Mellivora capensis*	Mustelidae	LR/lc	X	X	X	X	X	/	X	X
24	Bush pig	*Potamochoerus larvatus*	Suidae	LR/lc	X	/	X	X	X	/	/	X
25	Klipspringer	*Oreotragus oreotragus*	Bovidae	LR/cd	X	/	/	X	X	/	X	X
26	Bushbuck	*Tragelaphus scriptus*	Bovidae	LR/lc	X	/	/	X	X	/	/	X
27	Common Duiker	*Sylvicapra grimmia*	Caprinae	LR/lc	X	/	X	X	X	/	X	X
28	Gent (faro)	*Genetta genetta*	Viverridae	LR/lc	**X**	**X**	**X**	**X**	**X**	**X**	/	X
29	Common home Rat	*Arvicanthis Spp*	Murinae	LR/lc	X	X	X	X	X	X	X	X
30	Harrington's Rat	*Desmomys harringtoni*	Murinae	LC	X	X	X	X	X	X	X	X
31	White toothed Rat	*Crocidura baileyi*	Murinae	LC	/	/	/	/	/	/	X	/
32	Un striped grass rat	*Arvicanthis abyssinicus*	Murinae	LC	/	/	/	/	/	/	X	/
33	Narrow-headed Rat	*Stenocephalemys griseicauda*	Murinae	NT	/	/	/	/	/	/	X	/

No	Common name	Scientific name	Family	C0nservation Status	Distribution in sampled forest patches and outside sampled site							
					Al	CH	GE	AB	AN	GUZ	GU	Outside study site
34	Lovat'smouse	*Dendromus lovati*	Nesomyidae	VU	/	/	/	/	/	/	X	/
35	Harsh-furred rat	*Lophuromys flavopunctatus*	Muridae	LC	/	/	/	/	/	/	X	/
36	Swamp rat	*Otomys typus*	Otomyinae	LC	/	/	/	/	/	/	X	/
37	Common mole rat	*Tachyoryctes splendens*	Spalacidae	LC	/	/	/	/	/	/	X	/
38	White-footed rat	*Stenocephalemys albipes*	Spalacidae	LC	/	/	/	/	/	/	X	/
39	Soft-furred Rat	*Myomys albipes*	Spalacidae	L/C	/	/	/	/	/	/	X	/
40	Groove-toothed rat	*Pelomys harringtoni*	Murinae	LC	/	/	/	/	/	/	X	/
41	Harrington's Rat	*Desmomys harringtoni*	Murinae	LC	/	/	/	/	/	/	X	/
	Total				**24**	**13**	**14**	**21**	**20**	**13**	**24**	**28**

Key:: EX= Extinct, **EW**= Extinct in the wild, **CR**= Critically Endangered, **EN**= Endangered, **VU**= Vulnerable, **NT**= Near Threatened, **LC** =Least Concern, **DD** =Data Deficient, **LR/cd**= Lower Risk/conservation dependent, **LR/nt**= Lower Risk/near threatened, **LR/lc**= Lower Risk/least concern, **Al**=Alemsaga, **CH**=Checheho, **GE**=Gendatemem, **AB**=Abasayo, **AN**=Anchefena, **GUZ**=Guza, **GU**=Guna, **X=** Observed or believed to be exist, /= Not exist,

Table 2. Endemic Species of large and small animals

No	Common name	Scientific name	Family	Conservation Status
1	Gelada	*Theropithecus gelada*	Cercopithecidae	LR/nt Locally critically endangered at Guna
2	Ethiopian Wolf	*Canis simensis*	Canidae	EN (Not seen in the last 5 years at Guna
3	Ethiopian Highland Hare	*Lepus starcki*	Leporidae	LR/lc rarely seen at Guna shrub lands
4	White Toothed Rat	*Crocidura baileyi*	Murinae	LC Guna grassland
5	Unstriped grass rat	*Arvicanthis abyssinicus*	Murinae	LC Guna grassland
6	Soft-furred Rat	*Myomys albipes*	//	L/C Guna grassland

This study provides as a rough precautions spring board .to conduct further investigation on diversity and sustainable conservation systems to save wildlife and their natural habitats that are at verge of extinction.

Table 3. List, Conservation status and distribution of Endemic Bird species of Ethiopia and Eritrea

No	*Common name*	*Scientific name*	*Family*	*Endemism*	*Conservation Status*	*Distribution in the study area*
1	Wattled Ibis	Bostrychia carunculata	Threskiornithidae	*ETH & ERI*	*LC*	*Alemsaga*
2	Blue-winged Goose	Cyanochen cyanopterus	Anatidae	*ETH & ERI*	*NT*	*Alemsaga and Guna*
3	Harwood's Francolin	Francolinus harwoodi	Phasianidae	*ETH*	*VU*	*Alemsaga, Gendatemem and Anchefena*
4	Spot-breasted Lapwing	Vanellus melanocephalus	Charadriidae	*ETH*	*LC*	*Guna, Alemsaga*
5	Black-winged Lovebird	Agapornis taranta	Psittacidae	*ETH & ERI*	*LC*	*Guna, Anchefena*
6	White-collared Pigeon	Columba albitorques	Columbidae	*ETH & ERI*	*LC*	*Guna, Anchefena*
7	Banded Barbet	Lybius undatus	Capitonidae	*ETH & ERI*	*LC*	*Checheho, Gendatemem*
8	Abyssinian Woodpecker	Dendropicos abyssinicus	Picidae	*ETH & ERI*	*LC*	*Gedatemem, Checheho, Alemsaga*
9	Rueppell's Chat	Myrmecocichla melaena	Muscicapidae	*ETH & ERI*	*LC*	*Checheho, Guza, Anchefena*
10	Abyssinian Slaty Flycatcher	Dioptromis chocolatina	Monarchidae	*ETH*	*LC*	*Alesaga, Abasayo, Anchefena, Guza, gendatemem*
11	Thick-billed Raven	Corvus crassirostris	Corvidae	*ETH & ERI*	*LC*	*Guna, Anchefena, Guza,*
12	White-billed Starling	Onychognathus albirostris	Sturnidae	*ETH & ERI*	*LC*	*Checheho*
13	Ankober Serin	Carduelis ankoberensis	Fringillidae	*ETH*	*EN*	*Guna*
14	Black-headed Siskin	Serinus nigriceps	Fringillidae	*ETH*	*LC*	*Guna, Anchefena*
15	Abyssinian Longclaw	Macronyx flavicollis	Motacillidae	*ETH*	*NT*	*Alemsaga, Guna, Anchefena, Gendatemem*
16	Rouget's Rail	Rougetius rougetii	Rallidae	*ETH & ERI*	*LC*	*Checheho, Gendatemem*
17	Yellow fronted parrot	Polcephalus flavifrons	Psittacidae	*ETH*	*LC*	*Alemsaga, Abasyo, Anchefena and Gedatemem*
18	Abyssinian Catbird	Parophasma galinieri	Timaliidae	*ETH*	*LC*	*Anchefena, Abasayo, Gendatemem*
19	Black-headed Forest Oriole	Oriolus monacha	Oriolidae	*ETH & ERI*	*LC*	*Abasayo, Alemsaga, Anchefena, Gendatemem*
20	White-WingedCliff-Chat	Myrmecocichla semirufa	Muscicapidae	*ETH & ERI*	*LC*	*Checheho, Anchefena, Guna*
21	White backed Black Tit	Parus leuconotus	Paridae	*ETH & ERI*	*LC*	*Checheho, Guza*

***Key: ETH** = Ethiopia, **ETH & ERI=** Ethiopia and Eritrea*, **VU** Vulnerable, **NT** Near Threatened, **LC** Least Concern, **DD** Data Deficient, **LR/cd** Lower Risk/conservation dependent, **LR/nt** Lower Risk/near threatened, **LR/lc** Lower Risk/least concern

***Source**; Conservation status and endemism extracted from (JOSE LUISVIVERO POL, 2006)*

7.3. Threats to wildlife and natural habitats

Wildlife and natural habitats in the highlands of South Gondar are not legally protected and subjected to extensive grazing, encroachment and extractive use of natural vegetation and wildlife hunting. Major threats of these forest patches are emanated from human activities, use system and low attention to conservation of diversity vegetation components and wild animals including their habitats. As a result only resistant species to deforestation by re-growth and non selected species for human use and livestock feed have been dominated the cover of secondary vegetation.



Fig. 17 *Extensively cultivated landscape Damot around the peak and extensive gorge towards Meket from Checheho*

Different anthropogenic activities on natural forest area are selective cutting and removal of ground vegetation and live branches. Destruction of feeding and breading sites, vantage points and home ranges of many large wild animals and dense forest and shrub lands through hunting and chasing. Efforts to control forest patches are not far from prevention of aggressive deforestation, settlement and cultivation it is gradual and hidden hit to wildlife and their habitats and its effect sustains to long if nit reverted. Direct hunting with soundless weapons and traps are common targeting to feeding, breeding and resting sites of wild animals. Conservation and management has been limited monitoring extensive and extractive live plant deforestation. Rehabilitation of vegetation in some areas limited to allowing for secondary growth and enriching with exotic plants.

Besides deforestation through selective cutting, encroachments by settlement, expansion of farmlands and overgrazing species of herbivore wild animals are over hunted and birds like Guinea fowl, Harwood and Scaly francolins are also extensively hunted by string traps by the communities as a source of bush meat. Some species like Rock Hyrax are hunted to feed dog to make strong during hunting. Others like olive baboon and vervet monkey and crested porcupine are also considered as vermin.

To summarize major threats and challenges on natural areas are low awareness on values of wildlife and natural habitats, extensive over grazing, encroachment by settlement and expansion of farmland, removal of grasses, and disturbance with unrestricted movement, no or low effective protection measures disturbance and unrestricted movement, use and management conflict

7.4. Root causes to challenges and mitigation approaches

There is no inherent inimical conflict between wildlife and natural habitats with local communities. As historical evidences show wildlife and natural landscape where used as a source food and shelter for centuries particularly during Italian aggression wild animals were served as food and natural landscape as a shelter for patriots Moreover, natural habitats were used to depart non infected domestic stocks during epidemic diseases outbreak. The communities also have considerable know how the ecological values of natural habitats particularly use of forests to sustain moisture and sources of water to feed river courses. However, it is not supported with proper conservation and sustainable uses of these resources have been exacerbated with various threats and challenges.

7.4.1 Root Causes and Challenges

In high lands of South Gondar major challenges and root causes to aggravation of threats to wildlife and their natural habitats goes to high population pressure, poverty, continuous traditional cultivation, decreasing productivity of existing farmland, low awareness and sense of ownership on vales of wildlife and their habitats, low development of suitable conservation measures capable by subsistence communities. Fail in enforcement of conservation laws and control of illegal acts by respective institutions and authorities. These created conducive conditions and enforced communities to act illegal ways in looking for additional farming plot, settlement and grazing areas to satisfy daily food demand through extractive and consumptive uses of resources.

More importantly high population pressure, poverty, expansion of cultivated and settlement raised from additional lands to compensate decreasing productivity of existing farmland, low awareness and respnsibilility on sense of ownership and enforcement of laws, development of suitable and timely conservation measures that are capable by subsistence communities are major issues that require due attention.

7.4.2. Solutions to combat Challenges

Solution to mitigate these challenges and threats also goes to awareness creation on the value of wildlife and natural habitats for the communities and use of intensive and improved agricultural technologies that can be applied by subsistence farming. Arrange discussion meeting with the local authorities and communities on development of sustainable conservation systems and sustainable use of natural habitats and wildlife in highlands of South Gondar. Conservation measures integrated with participatory planning and sustainable management with equitable benefit sharing pertaining to sustain wildlife and their natural habitats. Creating suitable land tenure that can show quickly defined ownership for communal areas and accountability on improper uses, degradation of land and biodiversity.

Development of land use policy pertaining to reduce causes to natural habitats and wildlife loss and enforcement of laws. Provide opportunity and consecutive monitor support to the local community and traditional institutions to develop by laws to conserve natural habitats by their own mode of management with responsible and to improve the natural habitats. All process

should be supported and reconciled with national and regional conservation strategies integrating all concerned institution collaborative approach. Reduce duplication of institutional approaches on specific site on specific time on similar conservation activities.

Possible distinctive measures to mitigate threats and challenges on wildlife and their habitats are awareness development, frequent discussion, enforcement of laws, timely measure for illegal acts, prohibiting selective cutting and removal of ground vegetation, control of hunting, overgrazing, prevention of farm land and settlement expansion, delineating natural areas for protection and sustainable use and develop management plan for sustainable and participatory conservation. More importantly government authorities and local leaders should respond to urgent implementation of sustainable measures.

Table.4. Summary of mosaic complex of category, interweaves, biodiversity, threats, effects and conservation measures

Altitudinal ranges	Forest patches for the study	Ecosystem	Major habitats	Biodiversity	Threats and challenges	Conservation Efforts	Possible Conservation measures
2000 to 2700 masl	Alemsaga, Checheho and Gendatemem	Dry Montane Evergreen and Wetland Ecotone, Scrub Dry Montane	Shrub land Mixed Wooded Cliff and valleys	Harwood Francolin Variety of other forest and shrub and wet land birds And Borrow animals and primates	Selective cutting Hunting Overgrazing Fragmentation Removal of natural cover Disturbance and unrestricted movement Ineffective protection measure Use and management conflict Low awareness on values of wildlife and natural habitats	Protection of extensive live plant cutting and expansion of farm land recently in some areas	Awareness development Frequent discussion with the community Prohibit selective cutting and removal of ground vegetation Control of hunting, overgrazing Prevention of farm land and settlement Development of bylaws Enforcement of laws and timely measure for illegal acts
2700 to 3500 masl	Abasayo, Anchefena and Guza	Dry Montane Evergreen forest, Shrub dry Montane	Dense Forest, Shrub, river bank, escarpment and Cliffs	Borrow and Primates and variety of forest and cliff adapted endemic birds and mammals	Encroachment and shrieked forest size, Overgrazing and removal of undergrowth, fragmentation, disturbance and unrestricted movement Expansion of farmland and settlement Low protection measures Low rehabilitation effort Low awareness on values of wildlife and natural habitats	Limited to Protection of live plant extraction from core area.. Prohibiting live cut and settlement	Awareness development Frequent discussion with the community Strict grazing and removal of ground vegetation Rehabilitation of shrub lands of peripheral sites Delineating natural areas for protection and sustainable use Select suitable rehabilitation mechanism Enforcement of laws and timely measure for illegal acts
Greater than 3500 masl	Guna (Devanalt, Damot, Mokash)	Afro alpine and Sub Afro alpine	Moorland with open grassland Ericaceous shrub Scrub and steep hills Rock heap and Seasonal swamp land	High endemic birds, Rock Hyrax and Common jackal and highland open area adaptive endemic small mammal species.	Extensive over grazing, Encroachment by settlement and expansion of farmland, Removal of grasses, and disturbance with unrestricted movement No protection measures No rehabilitation effort Low awareness on values of wildlife and natural habitats	There is no any protective measure Field guards' control plantation which is out of core area of natural forest.	Awareness development Frequent discussion with the community Negotiation with the community in delineating natural areas for protection and sustainable use Select suitable rehabilitation mechanism Delineation of natural areas for different sustainable uses, Develop management plan for sustainable and participatory conservation by the community Enforcement of laws and timely measure for illegal acts

8. Major findings

- Highlands of South Gondar has complex topography with marvelous Afro-alpine and Dry evergreen montane ecosystems that have a thoughtful effect on the evolution, composition and distribution of wild flora and fauna.
- The area is up stream source of rivers that drain to Tana, Tekeze and Abay basin start and rich in impressive momentary look landscape, inland bridge (Checheho), seasonal color and cover change features.
- The area is also comprise wide range of altitudinal variation that extends about 1000masl in Tekeze upper basin to 4200masl at the peak of Gunna mountain ridges where conducive natural environment that encompasses diverse species of flora and fauna.
- Such ecological variability has contributed to the abundance of diverse groups of terrestrial wild fauna, making the area an important area of diversity and endemism.
- In this study a total of 41 species of large and small mammals belonging to 18 Families were recorded. Six of these are endemic species, and are almost exclusively confined to the Guna highlands plateau and associated forest patches.
- Three of the endemics namely: Ethiopian Wolf (locally extinct), Gelada Baboon (only about 15 individuals) and Stack's Hare (rarely seen) are large mammals while the remaining are small mammals
- The avian species recorded harbors 134 species. This is about 16% of the total Birds of Ethiopia are grouped into 45 Families. Of these, 8 species are endemic to Ethiopia, while 13 other species are found only in Ethiopia and Eritrea.
- Though there is no inherent inimical conflict between wildlife and natural habitats with local communities but natural vegetation patches are left in areas where protected as a forest reserve and or inaccessible for cultivation and other uses.
- Historically wildlife and natural landscape where used as a source of food and shelter for centuries
- Natural areas in all categories are being used for activities beyond its natural potential and are far from sustaining in its natural process more or less in similar ways
- Major threats and challenges on natural areas are low awareness on values of wildlife and natural habitats, extensive over grazing, encroachment by settlement and expansion of farmland, removal of grasses, and disturbance with unrestricted movement, no or low effective protection measures disturbance and unrestricted movement, use and management conflict
- The root causes to aggravation of threats to wildlife and their natural habitats goes to high population pressure, poverty, continuous traditional cultivation, decreasing productivity of existing farmland, low awareness and sense of ownership on vales of wildlife and their habitats, low development of suitable conservation measures capable by subsistence communities.
- Possible measures to mitigate threats and challenges on wildlife and their habitats are awareness development and frequent discussion with the community, development and enforcement of laws and timely measure for illegal acts, prohibit selective cutting and removal of ground vegetation, control of hunting, overgrazing, prevention of farm land and settlement , delineating natural areas for protection and sustainable use, rehabilitation mechanism and develop management plan in sustainable participatory conservation and utilization. More importantly government authorities and local leaders should respond to request for implementation of sustainable measures.

- There are different natural habitats still require detail studies on their biological, topographic and anthropogenic settings associated with threats, sustainable conservation and potential for tourism industry
- Rehabilitation of these natural areas is conducive for controlling existing extensive soil and land degradation and maintaining ecological balance improve hydrological system and productivity of natural habitats and farmlands

9. Conclusion and recommendations

It is well accepted in highlands of South Gondar has few remnant forests where preserved because of their inaccessibility and less in utility preferences. Forests were preserved through simple rules of exclusion and use base on the prevailing tenure system. Community cohesiveness, and homogeneity backed by history and religion helped to preserve forests state penetration and control of forests led to breakdown of rules and open access resulting in the destruction of the forests

Natural areas in all categories in altitudinal ranges and sample forest patches are being used for activities beyond its natural potential and are far from sustaining in its natural process more or less in similar ways. The matter is more tend to anthropogenic factors dominated by ever increasing winning behavior of human need magnified environmental degradation. It is now widely accepted that much of the soil and water loss and land degradation in all sites of study areas has to do with the human factor exploiting the environment in an unsustainable manner.

South Gondar comprises different landmass with spectacular features of various natural ecosystems. These are Afro alpine and Sub Afroalpine, Dry Evergreen Montane Shrub and Grassland Complex, Wetlands ecosystems. These ecosystems comprised different habitats such as Moorland open grassland, Afro alpine rock heap, hill with scrub rock outcrops, scattered rock hills, narrow strip dens forest patch, shrub land with scattered trees, riverine, seasonal wetlands, marsh areas dominated by connected mountain ridge landmass with associated lowlands. Sample sites of the study areas have different species of wildlife and natural habitats with different proportion. However, species composition and types of endemism vary in altitudinal ranges as discussed in sample areas of the study.

Though there is no inherent inimical conflict between wildlife and natural habitats with local communities this rapid ecological assessment and field evaluation showed that natural vegetation patches are left in areas where protected as a forest reserve and or difficult and inaccessible for cultivation and delineated for other uses. However, the large portion of these areas and species composition of wildlife (fauna and Flora) has been deteriorated at alarming rate which calls for immediate action to revert. Currently, even in churches and monasteries only few remnant scattered tries with shrieked area coverage are left. Many of forest reserves are also deforested by hidden hit of selective cutting, removal of ground vegetation, hunting of associated wild animals and uncontrolled grazing. These threats are prevalent in all sample sites but the proportions of natural areas left are varying in size. Similarly ways and procedures to mitigate challenges and reduce root cases are more or less similar.

First valuing natural areas in ecological, historical and economical significance will draw the attention of relevant stakeholders. For instance, in historical perspective natural landscape

where used as a source of food and shelter in many times particularly during Italian aggression wild animals were served as food and natural landscape as a shelter for patriots.

In high lands of South Gondar major challenges and root causes to aggravation of threats to wildlife and their natural habitats goes to high population pressure, poverty, continuous traditional cultivation, decreasing productivity of existing farmland, low awareness and sense of ownership on vales of wildlife and their habitats, low development of suitable conservation measures capable by subsistence communities. Moreover, there has been weak enforcement of conservation laws and control of illegal acts by respective authorities. These created conducive conditions enforced to strive in illegal ways for the community to look for additional farming, settlement and grazing areas to satisfy daily food demand through extractive and consumptive uses of resources.

To tackle these challenges the following recommendation has been forwarded giving attention to revert existing challenges of wildlife and their habitats as follow.

Major cases to wildlife and natural habitats degradation pertaining to altitudinal range are similar. Hence mitigation measures are also more or less similar and described as follows. The first step to mitigate these challenges and threats goes to awareness creation on the value of wildlife and natural habitats and introduction of intensive and improved agricultural technologies, discussion meeting with the local authorities and communities, sustainable conservation systems and use of natural habitats and wildlife.

Conservation measures should be integrated with participatory planning and sustainable management with equitable benefit sharing pertaining to sustain wildlife and their natural habitats. Creating suitable land tenure that can show quickly defined ownership for communal areas and accountability on improper uses, degradation of land and biodiversity.

Development of land use policy to combat natural habitats and wildlife loss and enforcement. Development of by laws to conserve natural habitats of South Gondar supported and reconciled with national and regional conservation strategies integrating all concerned institution collaborative approach. Reduce duplication of institutional approaches on specific site on specific time on similar conservation activities. These are paramount issues to revert the loss of wildlife and their habitats coupled with preventing soil depletion; deforestation and absence of effective rain fall that contribute to reduce an alarming decline of agricultural productivity.

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Annex 1.List of Bird Species observed in the study area

No	Common name	Scientific name	Family
1	**Black Kite**	**Milvus migrans**	**Accipitridae**
2	**Tawny Eagle**	**Aquila rapax**	**Accipitridae**
3	**Augur Buzzard**	**Buteo rufofuscus**	**Accipitridae**
4	**Rueppell's Griffon**	**Gyps rueppellii**	**Accipitridae**
5	**Scaly Francolin**	**Francolinus squamatus**	**Accipitridae**
6	**Moorland Francolin**	**Francolinus psilolaemus**	**Accipitridae**
7	**Swainson's Sparrow**	**Passer swainsonii**	**Accipitridae**
8	**Lammergeier**	**Gypaetus barbatus**	**Accipitridae**
9	**Pale Rockfinch**	**Carpospiza brachydactyla**	**Accipitridae**
10	**Rufous-breasted Sparrow Hawk**	**Accipiter ruffiventris**	**Accipitridae**
12	**African Little Sparrow-Hawk**	**Accipiter minullus**	**Accipitridae**
13	**Yellow-spotted Petronia**	**Petronia pyrgita**	**Accipitridae**
14	**Egyptian Vulture**	**Neophron percnopterus**	**Accipitridae**
15	**Hooded Vulture**	**Necrosyrtes monachus**	**Accipitridae**
16	**Red-capped Lark**	**Calandrella cinerea**	**Alaudidae**
17	**Short-tailed Lark**	**Pseudalaemon fremantlii**	**Alaudidae**
18	**Pied Kingfisher**	**Ceryle rudis**	**Alcedinidae**
19	**Malachite Kingfisher**	**Alcedo cristata**	**Alcedinidae**
20	**Blue-winged Goose**	**Cyanochen cyanopterus (E)**	**Anatidae**
21	**White-rumped Swift**	**Apus caffer**	**Apodidae**
22	**Scarce Swift**	**Schoutedenapus myoptilus**	**Apodidae**
23	**Common Swift**	**Apus apus**	**Apodidae**
24	**Little Swift**	**Apus affini**	**Apodidae**
25	**Grey Heron**	**Ardea cinerea**	**Ardeidae**
26	**Cattle Egret**	**Bubulcus ibis**	**Ardeidae**
27	**Abyssinian Ground-Hornbill**	**Bucorvus abyssinicus**	**Bucerotidae**
28	**Silvery-cheeked Hornbill**	**Ceratogymna brevis**	**Bucerotidae**
29	**Black-billed Barbet**	**Lybius guifsobalito**	**Capitonidae**
30	**Double-toothed Barbet**	**Lybius bidentatus**	**Capitonidae**
31	**Banded Barbet**	**Lybius undatus**	**Capitonidae**
32	**Spot-breasted Lapwing**	**Vanellus melanocephalus (E)**	**Charadriidae**
33	**Spur-winged Plover**	**Vanellus spinosus**	**Charadriidae**
34	**Black-headed Lapwing**	**Vanellus tectus**	**Charadriidae**
35	**White-headed Mousebird**	**Colius leucocephalus**	**Coliidae**
36	**Speckled Pigeon**	**Columba guinea**	**Columbidae**
37	**Ring-necked Dove**	**Streptopelia capicola**	**Columbidae**
38	***Dusky Turtle Dove***	**Streptopelia lugens**	**Columbidae**
39	**Red-eyed Dove**	**Streptopelia semitorquata**	**Columbidae**
40	**White-collared Pigeon**	**Columba albitorques**	**Columbidae**
41	**Abyssinian Roller**	**Coracias abyssinica**	**Coraciidae**
42	**Rufous Crowned-Roller**	**Coracias naevia**	**Coraciidae**
43	**Red-billed Chough**	**Pyrrhocorax pyrrhocorax**	**Corvidae**
44	**Pied Crow**	**Corvus albus**	**Corvidae**
45	**Fan-tailed Raven**	**Corvus rhipidurus**	**Corvidae**
46	**Thick-billed Raven**	**Corvus crassirostris**	**Corvidae**
47	**Golden-breasted Bunting**	**Emberiza flaviventris**	**Emberizidae**
48	**Brown-rumped Bunting**	**Emberiza affinis**	**Emberizidae**
49	**Black-headed Siskin**	**Serinus nigriceps**	**Emberizidae**
50	**Abyssinian Citril**	**Serinus citrinelloides**	**Emberizidae**
51	**Brown-rumped Seedeater**	**Serinus tristriatus**	**Emberizidae**

No	Common name	Scientific name	Family
52	Streaky Seedeater	Serinus striolatus	Emberizidae
53	Yellow-rumped Serin	Serinus xanthopygius	Emberizidae
54	Yellow-fronted Canary	Serinus mozambicus	Emberizidae
55	Abyssinian Crimson-wing	Cryptospiza salvadorii	Estrildidae
56	Yellow-bellied Waxbill	Estrilda quartinia	Estrildidae
57	Black-faced Firefinch	Lagonosticta larvata	Estrildidae
58	Ankober Serin	Carduelis ankoberensis (E)	Fringillidae
59	Black-headed Siskin	Serinus nigriceps	Fringillidae
60	Black-winged Pratincole	Glareola nordmanni	Glareolidae
61	Three-banded Courser	Rhinoptilus cinctus	Glareolidae
62	Spur-winged Plover	Vanellus spinosus	Glareolidae
63	White-headed Sawwing	Psalidoprocne albiceps	Hirundinidae
64	Red-rumped Swallow	Cecropis daurica	Hirundinidae
65	Ethiopian Swallow	Hirundo aethiopica	Hirundinidae
66	Banded Martin	Riparia cincta	Hirundinidae
67	Lesser Honey guide	Indicator minor	Indicatoridae
68	Lesser Jacana	Microparra capensis	Jacanidae
69	Little Bee-eater	Merops pusillus	Meropidae
70	Red-throated Bee-eater	Merops bulocki	Meropidae
71	Carmine Bee-eater	Merops nubicus	Meropidae
72	Abyssinian Slaty Flycatcher	Dioptromis chocolatina	Monarchidae
73	Mountain Wagtail	Motacilla clara	Motacillidae
74	Abyssinian Longclaw	Macronyx flavicollis	Motacillidae
75	Rueppell's Robin-chat	Cossypha semirufa	Muscicapidae
76	Moorland Chat	Cercomela sordida	Muscicapidae
77	Silverbird	Empidornis semipartitus	Muscicapidae
78	African Grey Flycatcher	Bradornis microrhynchus	Muscicapidae
79	Northern Black-Flycatcher	Melaenornis edolioides	Muscicapidae
80	African Paradise-Flycatcher	Terpsiphone viridis	Muscicapidae
81	Rueppell's Chat	Myrmecocichla melaena	Muscicapidae
82	White-WingedCliff-Chat	Myrmecocichla semirufa	Muscicapidae
83	Tacazze Sunbird	Nectarinia tacazze	Nectariniidae
84	Helmeted Guineafowl	Numida meleagris	Numididae
85	Black-headed Forest Oriole	Oriolus monacha	Oriolidae
86	White backed Black Tit	Parus leuconotus	Paridae
87	Gray-headed Sparrow	Passer griseus	Passeridae
88	Harwood's Francolin	Francolinus harwoodi (E)	Phasianidae
89	Green Woodhoopoe	Phoeniculus purpureus	Phoeniculidae
90	Black Scimitar-bill	Rhinopomastus aterrimus	Phoeniculidae
91	Abyssinian Scimitar-bill	Rhinopomastus minor	Phoeniculidae
92	Abyssinian Woodpecker	Dendropicos abyssinicus (E)	Picidae
93	Green-backed Woodpecker	Campethera cailliautii	Picidae
94	Grey Woodpecker	Dendropicos goertae	Picidae
95	Red Bishop	Euplectes orix	Ploceidae
96	Speckle-fronted Weaver	Sporopipes frontalis	Ploceidae
97	Gray-headed Social-Weaver	Pseudonigrita arnaudi	Ploceidae
98	Little Weaver	Ploceus luteolus	Ploceidae
99	Black-necked Weaver	Ploceus nigricollis	Ploceidae
100	Golden Palm Weaver	Ploceus bojeri	Ploceidae
101	Rueppell's Weaver	Ploceus galbula	Ploceidae
102	Black-headed Weaver	Ploceus melanocephalus	Ploceidae
103	Baglafecht Weaver	Ploceus baglafecht	Ploceidae

No	Common name	Scientific name	Family
104	Salvadori's Weaver	Ploceus dichrocephalus	Ploceidae
105	Red Bishop	Euplectes orix	Ploceidae
106	Black-winged Bishop	Euplectes hordeaceus	Ploceidae
107	Orange Bishop	Euplectes franciscanus	Ploceidae
108	Parasitic Weaver	Anomalospiza imberbis	Ploceidae
109	Black-winged Lovebird	Agapornis taranta (E)	Psittacidae
110	Yellow fronted parrot	Polcephalus flavifrons	Psittacidae
111	Red-bellied Parrot	Poicephalus rufiventris	Psittacidae
112	Yellow-throated Greenbul	Chlorocichla flavicollis	Pycnonotidae
113	Common Bulbul	Pycnonotus barbatus	Pycnonotidae
114	Rouget's Rail	Rougetius rougetii	Rallidae
115	Black-winged Stilt	Himantopus himantopus	Recurvirostridae
116	Hamerkop	Scopus umbretta	Scopidae
117	Splendid Glossy Starling	Lamprotornis splendidus	Sturnidae
118	Rueppell's Glossy Starling	Lamprotornis purpuropteru	Sturnidae
119	Long-tailed Glossy Starling	Lamprotornis caudatus	Sturnidae
120	Red-winged Starling	Onychognathus morio	Sturnidae
121	Red-billed Oxpecker	Buphagus erythrorhynchus	Sturnidae
122	Yellow-billed Oxpecker	Buphagus africanus	Sturnidae
123	White-billed Starling	Onychognathus albirostris (E)	Sturnidae
124	Sacred Ibis	Threskiornis aethiopicus	Threskiornithidae
125	Hadada Ibis	Bostrychia hagedash	Threskiornithidae
126	Egyptian Goose	Alopochen aegyptiacus	Threskiornithidae
127	Wattled Ibis	Bostrychia carunculata (E)	Threskiornithidae
128	Abyssinian Catbird	Parophasma galinieri	Timaliidae
128	Olive Thrush	Turdus olivaceus	Turdidae
129	African Thrush	Turdus pelios	Turdidae
130	Abyssinian Ground Thrush	Zoothera piaggiae	Turdidae
131	Barn Owl	Tyto alba	Tytonidae
132	Hoopoe	Upupa epops	Upupidae
133	Village Indigobird	Vidua chalybeata	Viduidae
134	Pale-winged Indigobird	Vidua wilsoni	Viduidae