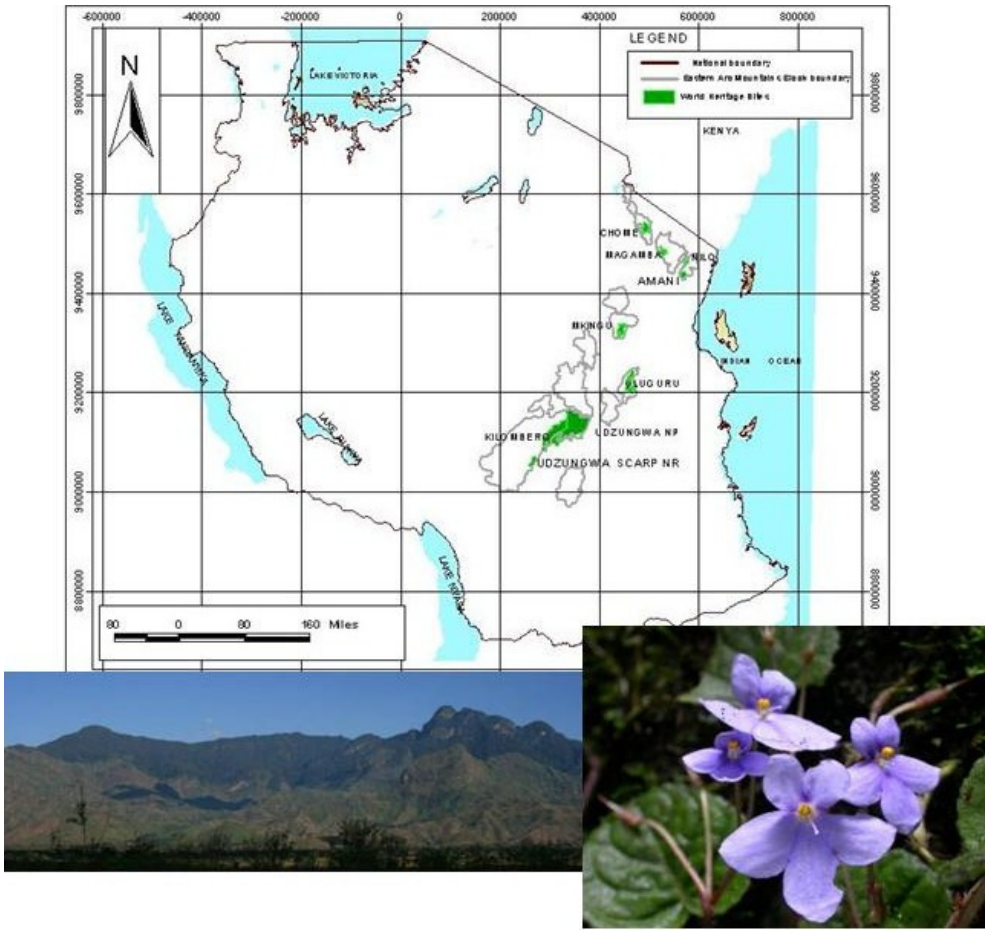
United Nations Educational, Scientific and Cultural Organisation

Convention Concerning the Protection of the World Cultural and Natural Heritage

NOMINATION OF PROPERTIES FOR INCLUSION ON THE WORLD HERITAGE LIST
SERIAL NOMINATION:

EASTERN ARC MOUNTAINS FORESTS OF TANZANIA



United Republic of Tanzania

Ministry of Natural Resources and Tourism

January 2010

CONTENTS

Eastern Arc Mountains World Heritage Nomination Process

The Eastern Arc Mountains are known to biologists and conservationists as one of the world's most important areas for biodiversity. This importance was first recognised by work undertaken in the 1970s (White 1983), and in the pioneering work on the identification of global biodiversity hotspots (Myers, 1990). Based on systematic analyses of available species data, the importance of the Eastern Arc Mountains has been recognised in the following analyses of global biological priority:

- Global 200 Ecoregion (WWF: Olson and Dinerstein 1998);
- part of a global biodiversity hotspot (Conservation International: Mittermeier et al., 1998; 2004); and
- part of an Endemic Bird Area (BirdLife International: ICBP 1992; Stattersfield et al., 1998).

However, despite this importance the area is yet to be recognized internationally through its inscription as a natural property on the World Heritage List. This was first noted at the 1997 Eastern Arc Mountains Conference held in Morogoro, Tanzania, organized by the Tanzania Forestry Research Institute (Burgess et al. 1998). A conclusion of that meeting was that the Eastern Arc Mountains would be a suitable candidate for a serial nomination, perhaps similar to the Australian Wet Tropics World Heritage property (Lovett 1998). The lack of a suitable World Heritage Site in the Eastern Arc was also noted in the UNEP-WCMC global review of the biodiversity coverage of World Heritage Sites (Magin and Chape 2004). The approach for developing an Eastern Arc Mountains World Heritage Site needed to address the geographical isolation of the 13 mountain blocks, the fragmentation of the forest within the respective blocks, and identify the most important sites to include within the property.

After the Eastern Arc conference of 1997, the Forestry and Beekeeping Division (FBD) and UNDP-GEF developed a conservation project for the Eastern Arc Mountains that included the successful serial nomination of the Eastern Arc Mountains for inscription on the World Heritage List as a primary output. The resulting FBD/UNDP-GEF Project, 'Conservation and Management of the Eastern Arc Mountain Forests', was started in 2003 and has run until 2010. The Project provided the funding to facilitate the process of developing the nomination of the Eastern Arc World Heritage property. From 2004 to 2009 the process focused on working within the national and local government systems to explain the World Heritage concept and gain support from the 5 regions and 15 districts that cover the Eastern Arc Mountains, and the support of the Forestry and Beekeeping Division and the Department of Antiquities, both within the Ministry of Natural Resources and Tourism.

During 2004-2009 considerable efforts were also made to promote biological study of the Eastern Arc Mountains through funding provided by the Critical Ecosystem Partnership Fund (established by a number of donors), UNDP-GEF and others. Support was also provided to compile all available records of species within Eastern Arc Mountain blocks using a Geographic Information System, enabling species' distributions to be mapped. By the end of 2009 detailed databases had been compiled for birds, mammals, reptiles and amphibians.

In 2009 UNESCO provided a World Heritage preparatory grant for technical assistance in the preparation of the nomination dossier, and for hosting a stakeholders meeting in December 2009 when the final steps of the nomination process were debated and agreed, with particular attention focused on the selection of sites for including in the serial nomination.

After the meeting in December 2009 the consultant team, and a group of international scientists, updated the available data on species values for every site in the Eastern Arc (see acknowledgements). This process allowed a full and transparent justification of the Outstanding Universal Values of the entire Eastern Arc, in terms of the mountain blocks within the Eastern Arc and the individual sites (mainly protected areas) within each block. This work resulted in a series of moderately comprehensive databases that cover all the animal and plant values

across the Eastern Arc. These data provide the basis for the selection of sites for inclusion in the serial nomination of the Eastern Arc Mountains.

In addition to the biological and conservation values of sites (i.e. species richness, endemism and threatened status), the integrity (area and connectivity), protection (legal status) and management (management plan status and provisions) of the sites across the Eastern Arc have been taken into account in the selection of sites. A further criterion is that each site is managed by a competent authority, in this case either the Forestry and Beekeeping Division or Tanzania National Parks. Thus, each site included in this serial nomination is large, rich in endemic species (including species endemic to the mountain block and/or site), designated as a nature reserve or national park (or in the process of being designated a nature reserve) and having a management plan that is up to date or in the process of being updated. As such, the sites selected by the Government of Tanzania for inclusion in this serial nomination for consideration by the World Heritage Committee have Outstanding Universal Values for which there is legal provision for their protection, together with plans and resources for their management. This methodology is described in more detail in Section 2a of the nomination.

The results of this site selection procedure were presented to key stakeholders at a meeting in Dar es Salaam, Tanzania on the 20th January 2010. Participants made a number of further interventions and the final set of sites to be included in the nomination was endorsed unanimously. The meeting also provided an opportunity to identify a series of initiatives to prioritise during the coming months following the submission of nomination and in anticipation of its evaluation and, hopefully, the inscription of the site on the World Heritage List.

Acknowledgements

Forestry and Beekeeping Division of the Ministry of Natural Resources and Tourism would like to thank the following people for their contribution to the compilation of the data used to justify the Outstanding Universal Values of the Eastern Arc Mountains, for animals: Kim Howell, Chacha Werema and Willirk Ngalasson of the University of Dar es Salaam (birds, mammals, reptiles, amphibians), Michele Menegon (reptiles and amphibians), Francesco Rovero (mammals), Nisha Owen (Mahenge, Rubeho and Ukaguru records), Nike Doggart, Charles Leonard and Andrew Perkin (North Pare, Mufindi and Rubeho records), Andrew Marshall (Udzungwa data), Lauren Persha (West Usambara data), Jonathan Green and Phil Clarke (analysis). For plants the data were developed by: Roy Gereau (TROPICOS database), Antje Ahrends (analysis and data from Mahenge, Ukaguru and Rubeho) and Jon Lovett (Eastern Arc data). Neil Burgess and Michael Green provided technical assistance in the preparation of the nomination dossier. Kekelia Kabalimu and Boniface Mbilinyi produced the maps. The process was overseen by the Forestry and Beekeeping Division, in particular by the late Felician Kilahama, Corodius Sawe, Evarist Nashanda, Christognus Haule, Luciana Mshana and Kevin Mndeme. The Forestry and Beekeeping Division welcomes the collaboration with Tanzania National Parks, with special thanks to Paul Banga for provision of information in support of this serial nomination. Particular thanks are due to Donatius Kamamba, Division of Antiquities, for advice and support concerning the submission of this nomination dossier on behalf of the Tanzanian Government.

DEDICATION

This nomination is dedicated to the late Corodius Sawe of the Forestry and Beekeeping Division who led the Eastern Arc World Heritage process from 2004 to 20th December 2009, when he passed away, and to the late Dr Alan Rodgers of UNDP-GEF for his vision and drive in establishing the project mechanism to enable the work to be undertaken. He passed away on 31st March 2009.

Executive Summary

<table>
<tr><td>State Party:</td><td>United Republic of Tanzania</td></tr>
<tr><td>State, Province or Region</td><td>Kilimanjaro, Tanga, Dodoma, Morogoro and Iringa Regions</td></tr>
<tr><td>Name of Property</td><td>Eastern Arc Mountains Forests of Tanzania</td></tr>
<tr><td>Geographical coordinates to the nearest second</td><td>37.0º E, 3.5º S northern limit
36.5º E, 9.5º S southern limit</td></tr>
<tr><td>Textual description of the boundary(ies) of the nominated property</td><td>A series of nine of the most important sites within the Eastern Arc Mountains ecoregion, in the eastern part of Tanzania extending from Mwanga District (Kilimanjaro) in the north to Mufindi District (Iringa) in the south</td></tr>
<tr><td>A4 (or "letter") size map of the nominated property, showing boundaries and buffer zone (if present)</td><td>Included overleaf</td></tr>
<tr><td>Justification
Statement of Outstanding Universal Value</td><td>The Eastern Arc Mountains, encompassing an area of some 23,000 km², are part of the Eastern Afromontane hotspot, one of 34 of the world's richest places for biodiversity that are under continuing extreme threat of loss of their original vegetation. This arc of mountains is geologically ancient, dating back at least 30 million years and possibly 100 million years, and individual blocks are isolated from each other, with the result that they have played an important role as refugia for plants and animals, and as centres of speciation over the millennia.

The Eastern Arc Mountains and Forests of Tanzania property proposed for inscription on the World Heritage List is a series of 9 protected areas within 6 of the 13 blocks that comprise the Eastern Arc Mountains, as follows:

<table>
<tr><th>Serial site</th><th>Mountain Block</th></tr>
<tr><td>Amani Nature Reserve</td><td>East Usambara</td></tr>
<tr><td>Nilo Nature Reserve</td><td>East Usambara</td></tr>
<tr><td>Mkingu Proposed Nature Reserve</td><td>Nguru</td></tr>
<tr><td>Chome Proposed Nature Reserve</td><td>South Pare</td></tr>
<tr><td>Kilombero Nature Reserve</td><td>Udzungwa</td></tr>
<tr><td>Udzungwa Mountains National Park</td><td>Udzungwa</td></tr>
<tr><td>Uzungwa Scarp Proposed Nature</td><td>Udzungwa</td></tr>
<tr><td>Uluguru Nature Reserve</td><td>Uluguru</td></tr>
<tr><td>Magamba Proposed Nature Reserve</td><td>West Usambara</td></tr>
</table>

These 9 sites encompass a total area of 451,365 ha, which represents approximately 20% of the Eastern Arc Mountains and includes at least 50% of the remaining 3,500 km² of forest. The sites have been selected for inclusion in the nomination as being, on the basis of current knowledge, universally outstanding examples of evolutionary and biogeographical processes, as well as having a wealth of species of plants and animals (vertebrates) that are endemic to the Eastern Arc Mountains and in numerous cases endemic to an individual site within the serial property.</td></tr>
</table>

This serial property is nominated on the basis of the following criteria:

Criterion (ix)

The property features important biological refugia, having numerous endemic taxa representing ancient lineages that have survived millions of years of climatic fluctuations elsewhere on the African continent, as well as being centres of more recent speciation and radiation. For example, all of the world's African violet (*Saintpaulia*) species are located in the forests of these mountains and many are endemic to the area.

DNA analysis has shown that the property provides a globally important record of the evolution of life on earth, especially for ancient groups of birds, mammals, reptiles and amphibians having 30 million year old and older radiations. Such evidence is based on there being at least 40 genera of plants and at least 6 genera of vertebrates that are endemic to the Eastern Arc Mountains.

The endemism comprises both newly evolved species and ancient relicts that have their origins in prehistoric times when a continuous swathe of forest was present across the whole of tropical Africa. This unique biogeography of the Eastern Arc Mountains, and its disjunct nature in patches that are elevated above the surrounding landscape, give patterns in species distributions and range that are akin to true islands, causing it to be dubbed as 'The Galapagos of Africa'.

Criterion (x)

The Eastern Arc Mountains rank among the world's top five sites for their diversity of plants, herpetofauna, birds and mammals when compared with 21 tropical forest World Heritage sites. They also hold among the highest numbers and concentration of rare and endangered species and genera of flora and fauna in the whole of Eastern Africa, including some 1,000 plant taxa believed to be threatened with extinction and 95 vertebrate species, reputedly the highest concentration of threatened species in the world. Much of this diversity is found within the serial sites, including 'flagship species'; such as five primate species (Red Colobus monkey, two species of Mangabey monkey and two or three species of nocturnal Galago) and all known species of African violets (*Saintpaulia*).

The 9 core areas that comprise the World Heritage serial nomination are spatially well-distributed across the Eastern Arc Mountains and hold more than 53% of 554 plant taxa and 76% of 118 vertebrate species endemic to the Eastern Arc Mountains. Their habitats provide refuge to 77% of the 170 single-site endemic plant taxa and 70% of the 47 single-site endemic vertebrate species currently known to be restricted in their distributions to a single mountain block of the Eastern Arc. Thus, each of the nominated core areas holds from 1 to 68 plant taxa and 1-11 vertebrate species that are unique (endemic) to that site.

The 9 serial sites contain examples of each of the main types of forest habitat within the Eastern Arc Mountains. The Udzungwa Mountains National Park and Kilombero Nature Reserve contain the full altitudinal

	range of the forest from lowland forest at 200 m, through sub-montane, montane and upper montane forest, to montane grasslands, heathlands and bogs above the tree line. Drier and ecologically unique montane woodlands are present on the lee slopes of Udzungwa Mountains, and there are important assemblages of xerophytic plants, including endemic species, growing on exposed rocky outcrops. The series of sites encompass at least 50% of the remaining natural habitat in the Eastern Arc Mountains, including true wilderness where there are no visible human impacts and large mammals, such as elephant, buffalo and lion, are still found living at high altitudes. The 9 sites are intact and have no people living inside their boundaries. Five of the 6 largest remaining patches of protected habitat in the Eastern Arc Mountains are included in the serial nomination, each of the 5 exceeding 23,000 ha and the rest ranging from approximately 6,000 ha to 14,000 ha. The two largest sites in the series are contiguous (Udzungwa National Park and Kilombero Nature Reserve) and plans are underway to link Kilombero Nature Reserve with the nearby proposed Uzungwa Scarp via Mngeta Corridor to provide a contiguous area in excess of 366,000 ha within the Udzungwa Mountain Block. This would amount to 16% of the total area of the Eastern Arc Mountains. There are also plans to link the two smallest nature reserves, Amani and Nilo, via Derema Corridor to create a contiguous unit of at least 14,600 ha. Peripheral to the boundaries of these 9 core areas and, indeed, all natural forests within the Eastern Arc Mountains are numerous settlements and extensive areas of cultivation, providing little or no short-term opportunity for establishing adjacent buffer zones. While there is effectively only 4,000 ha of de facto buffer zone (national Forest Reserves) peripheral to the core areas, local authority and village Forest Reserves cover an estimated 7,924 ha in the vicinity of the 9 serial sites. These forests meet some of the livelihood needs of village communities and, thereby, play an important role in reducing pressures on the forests protected for biodiversity and watershed conservation purposes. Good progress is also being made in encouraging village communities to establish buffer strips outside and contiguous with the boundary of nature reserve. Much more extensive is the network of national Forest Reserves within each mountain block, amounting to some 126,873 ha, which provide ‘stepping stones’, ‘corridors’ and refuges to plants and animals, all of which contributes to the maintenance and exchange of genetic diversity. The 9 serial sites comprise 8 nature reserves under the management of the Forestry and Beekeeping Division (FDB), of which 3 are in the process of being legally notified in 2010, and 1 national park under the management the Tanzania National Parks (TANAPA). All of these protected areas have management plans, with one exception (Uzungwa Scarp) that is being prepared in 2010. The national park management plan is currently under revision. Management plan objectives focus primarily on biodiversity conservation and also water conservation and provision, along with visitor

	management, research, education, outreach and enforcement. Over the last few years there have been significant increases in investment, both in staff numbers and capital expenditure. This trend is due to increase exponentially over the next five years for the recently and newly established nature reserves. Across the Eastern Arc, the communities surrounding the forests are also involved in the management of the forest resources. This management takes the form of Joint Management agreements in about 50% of the protected areas, whereby communities enter into an agreement with the Forestry and Beekeeping Division for the management of the area. There is also an increasing number of Village Land Forest Reserves in the Eastern Arc, especially in the East and West Usambara and Udzungwa Mountain blocks.
Criteria under which property is nominated (itemize criteria)	Criterion (ix) Criterion (x)
Name and contact information of official local institution/agency	Director General Forestry and Beekeeping Division Ministry of Natural Resources and Tourism P.O. Box 426. Dar es Salaam Tanzania Tel: +255 (0)23 2613082 Fax: + 255 (0)22 2130091 Website www.easternarc.or.tz

1. Identification of the Property

1.a Country

United Republic of Tanzania

1.b State, Province or Region

Regions of Kilimanjaro, Tanga, Dodoma, Morogoro and Iringa

1.c Name of the Property

Eastern Arc Mountains Forests

1.d Geographical Coordinates to the nearest second

Serial No.	Mountain Block	Name of property	PROVINCE District	Coordinates Decimal degrees	Altitude range (m)
01	East Usambara	Amani Nature Reserve	TANGA Muheza, Korogwe	**E 38.61 S 05.14**	300 - 1,128
02	East Usambara	Nilo Nature Reserve	TANGA Korogwe, Muheza, Mkinga	**E 38 65 S 04.92**	400 - 1,506
03	Nguru	Mkingu Proposed Nature Reserve	MOROGORO Mvomero District	**E 37.51 S 06.11**	380 - 2,140
04	South Pare	Chome Proposed Nature Reserve	KILIMANJARO Pare District	**E 37.95 S 04.29**	1,250 - 2,463
05	Udzungwa	Kilombero Nature Reserve	IRINGA Kilombero, Kilola	**E 36.44 S 07.92**	1,040 - 2,600
06	Udzungwa	Udzungwa Mountains National Park	IRINGA / MOROGORO Kilolo / Kilombero Districts	**E .35.95 S 08.39**	201 - 2,580
07	Udzungwa	Uzungwa Scarp Proposed Nature Reserve	IRINGA Kilombero / Muifindi / Kilolo Districts	**E 36.69 S 07.83**	300 - 2068
08	Uluguru	Uluguru Nature Reserve	MOROGORO Morogoro, Mvomero	**E 37.63 S 07.00**	600 - 2,638
09	West Usambara	Magamba Proposed Nature Reserve	LUSHOTO Lushoto	**E 38.25 S 04.73**	1,650 - 2,300

1.d Maps and plans, showing the boundaries of the nominated property and buffer zone

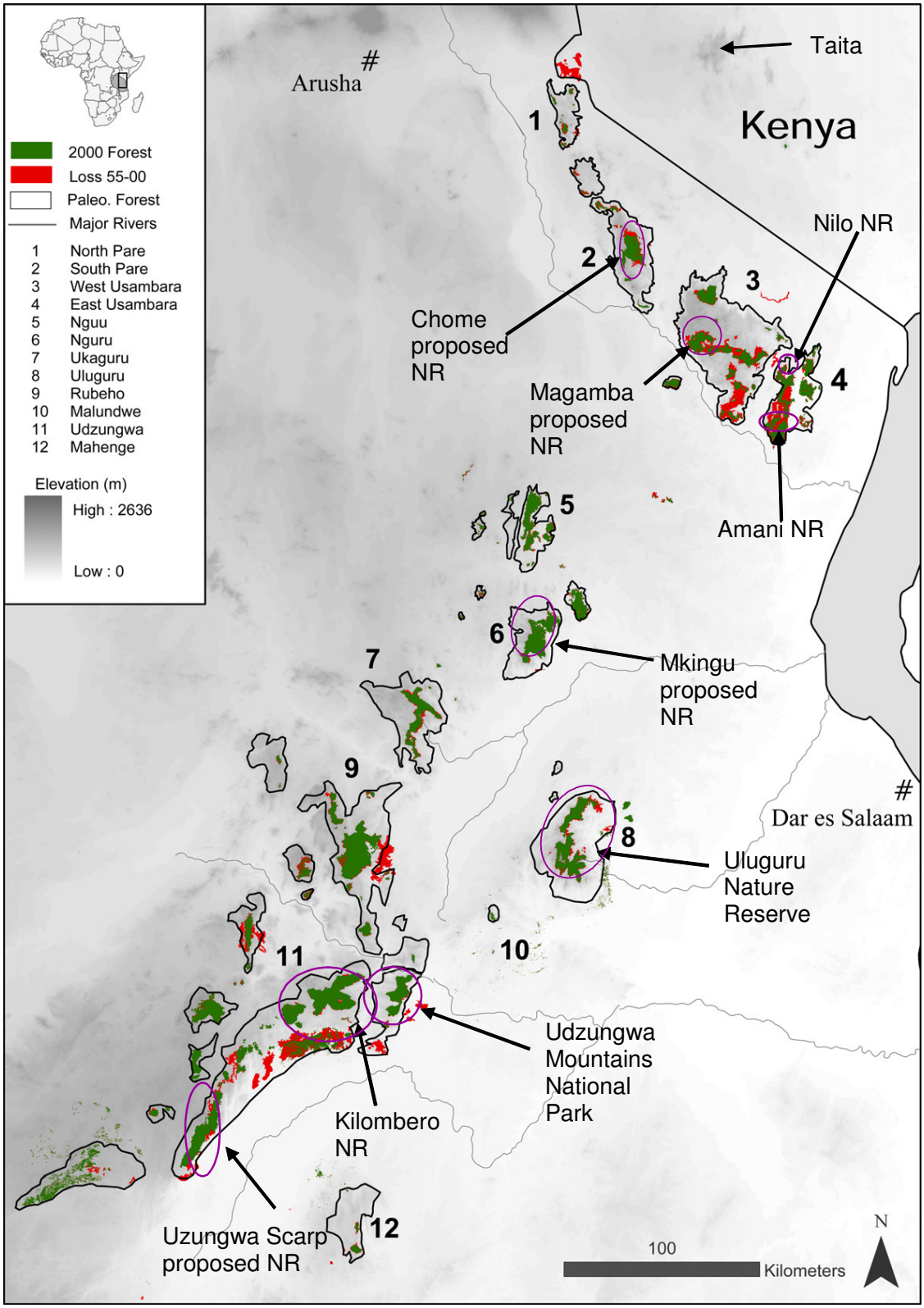
The following maps are included in Section 1.d:

- Map 1: Location of the 9 sites comprising the serial nomination of the Eastern Arc Mountains Forests, with their forest cover (modified after Hall et al., 2009)
- Map 2: South Pare Mountains Block, with Chome proposed Nature Reserve
- Map 3: West Usambara Mountains Block, with Magamba proposed Nature Reserve
- Map 4: East Usambara Mountains Block, with Nilo and Amani Nature Reserves

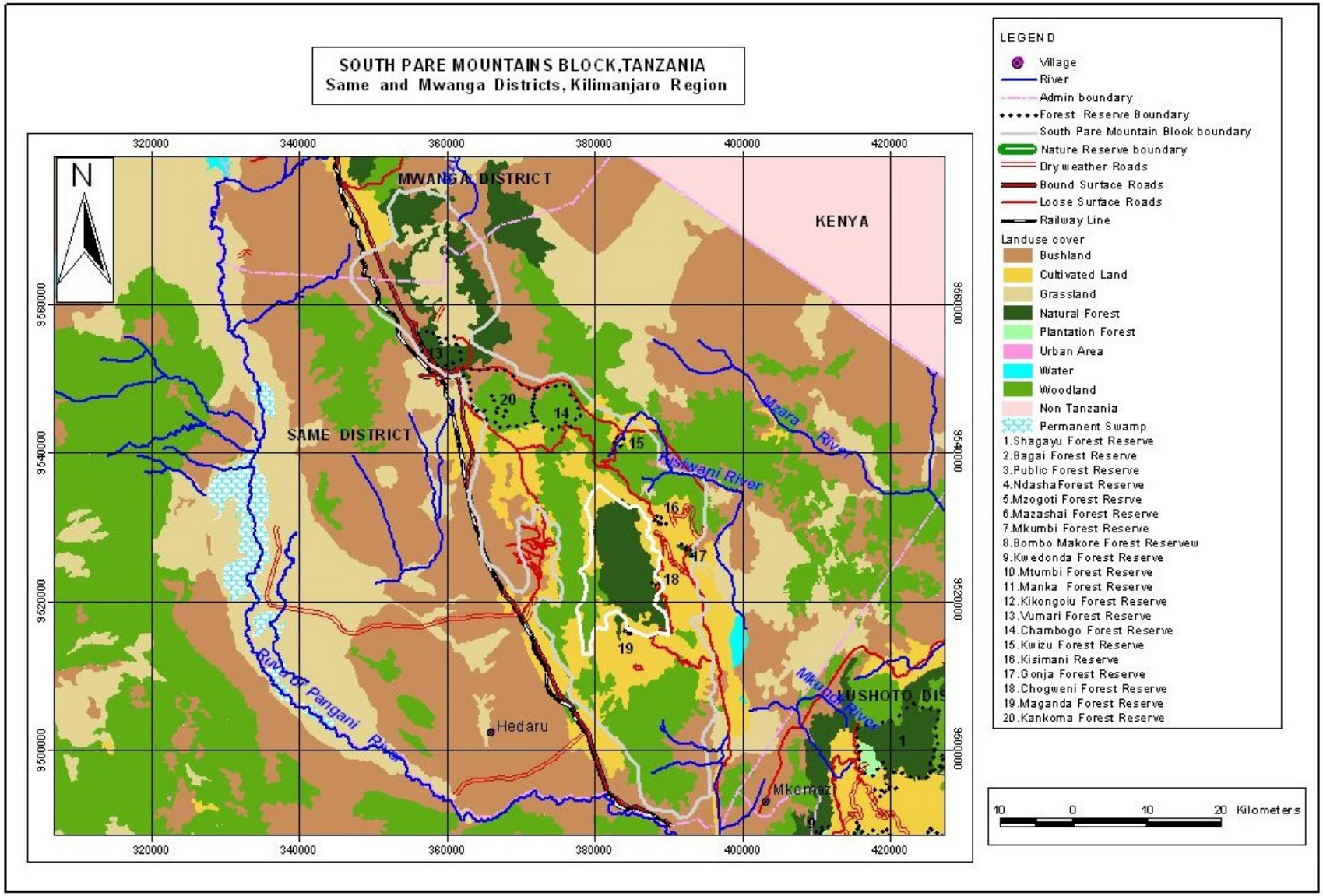
Map 5: Nguru Mountains Block, with Mkingu proposed Nature Reserve
Map 6: Uluguru Mountains Block, with Uluguru Nature Reserve
Map 7: Udzungwa Mountains Block, with Udzungwa Mountains National Park, Kilombero Nature Reserve, and Uzungwa proposed Nature Reserve

The following 9 maps of individual serial sites are included in Section 2.a under their respective Mountain Block:

Chome Proposed Nature Reserve
Magamba Proposed Nature Reserve
Nilo Nature Reserve
Amani Nature Reserve
Mkingu Proposed Nature Reserve
Uluguru Nature Reserve
Udzungwa Mountains National Park
Kilombero Nature Reserve
Uzungwa Scarp Proposed Nature Reserve



Map 1: Location of the 9 sites comprising the serial nomination of the Eastern Arc Mountains, with their forest cover (modified after Hall et al., 2009)



Map 2: South Pare Mountains Block, with Chome proposed Nature Reserve

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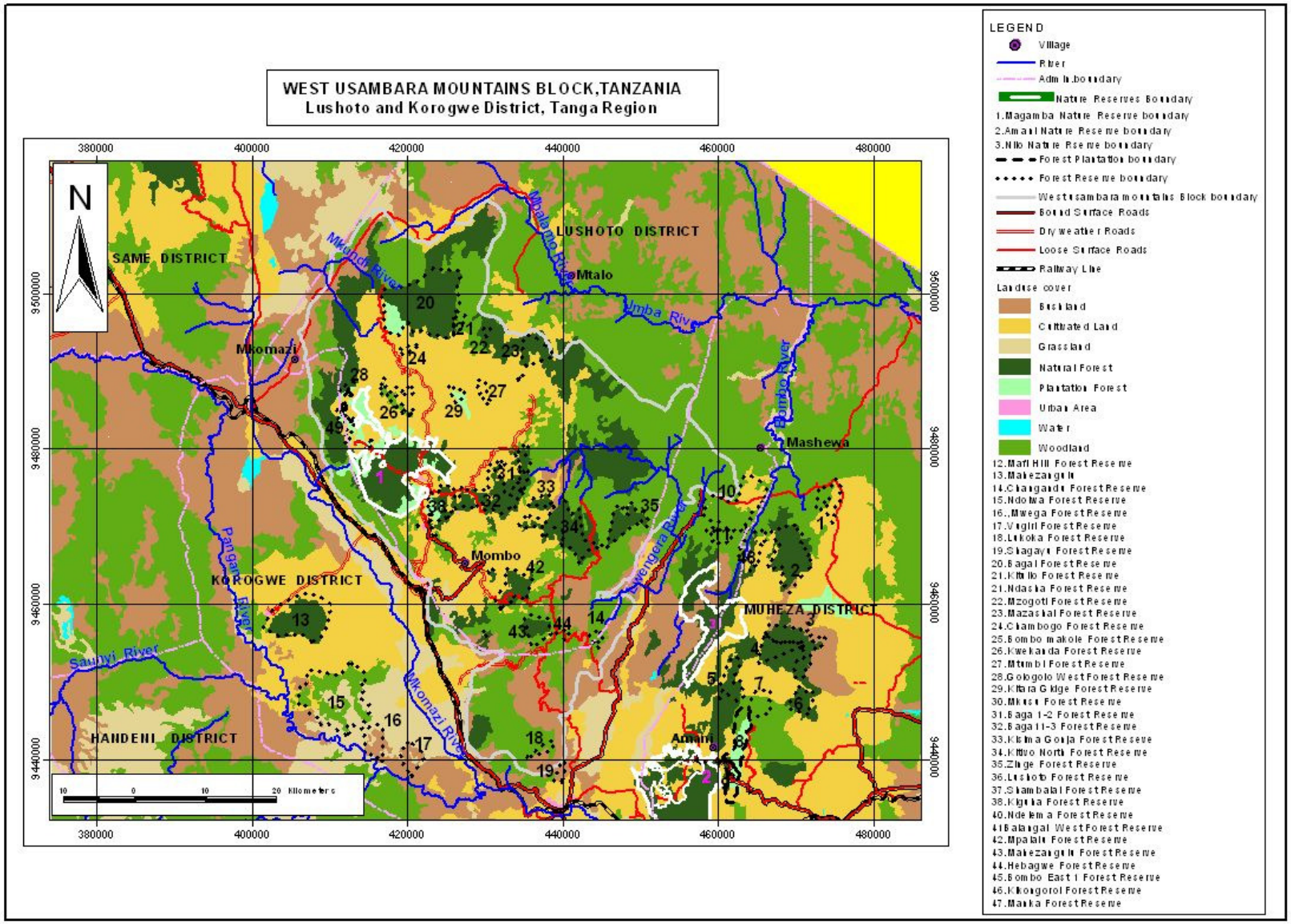
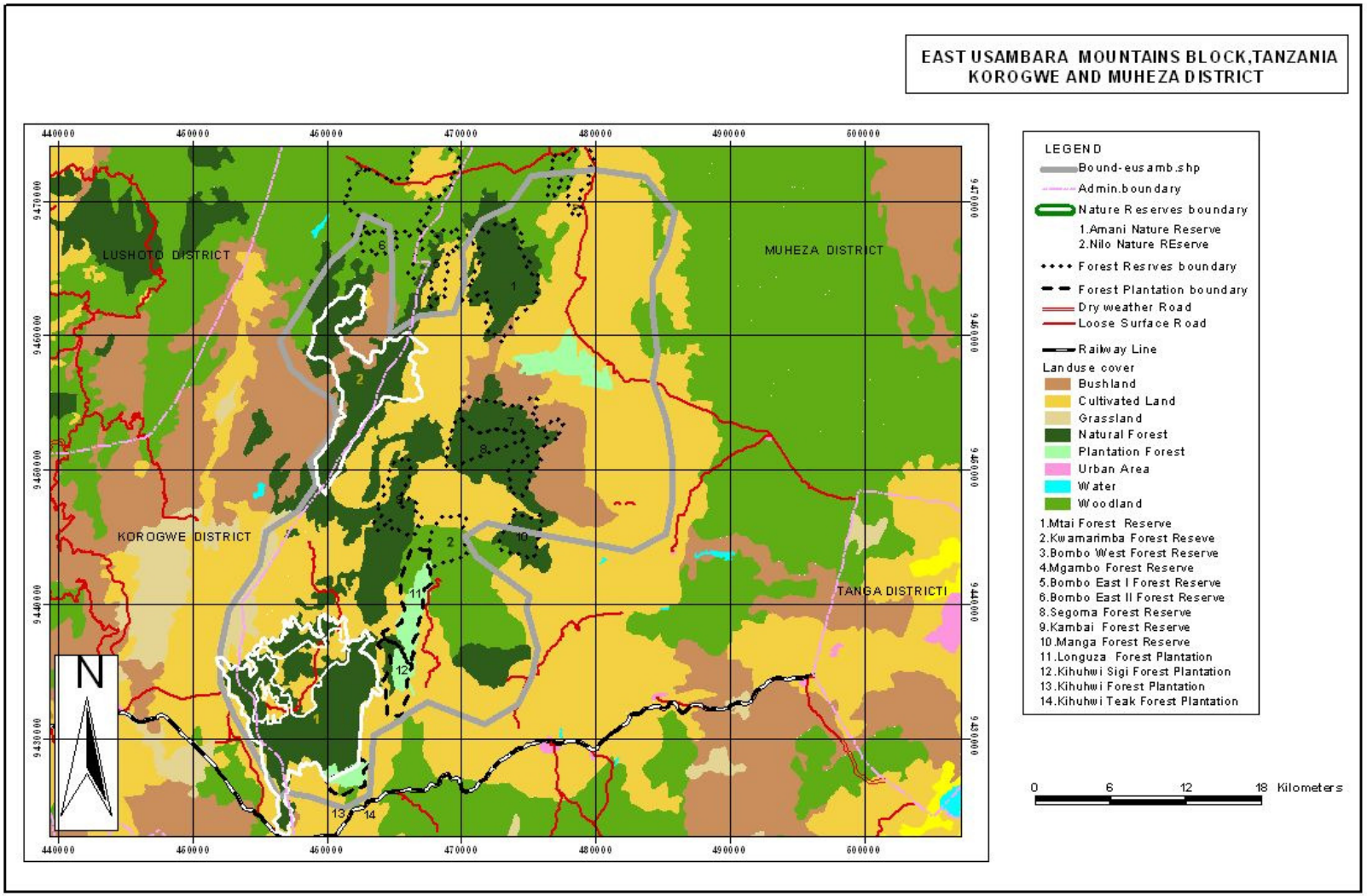
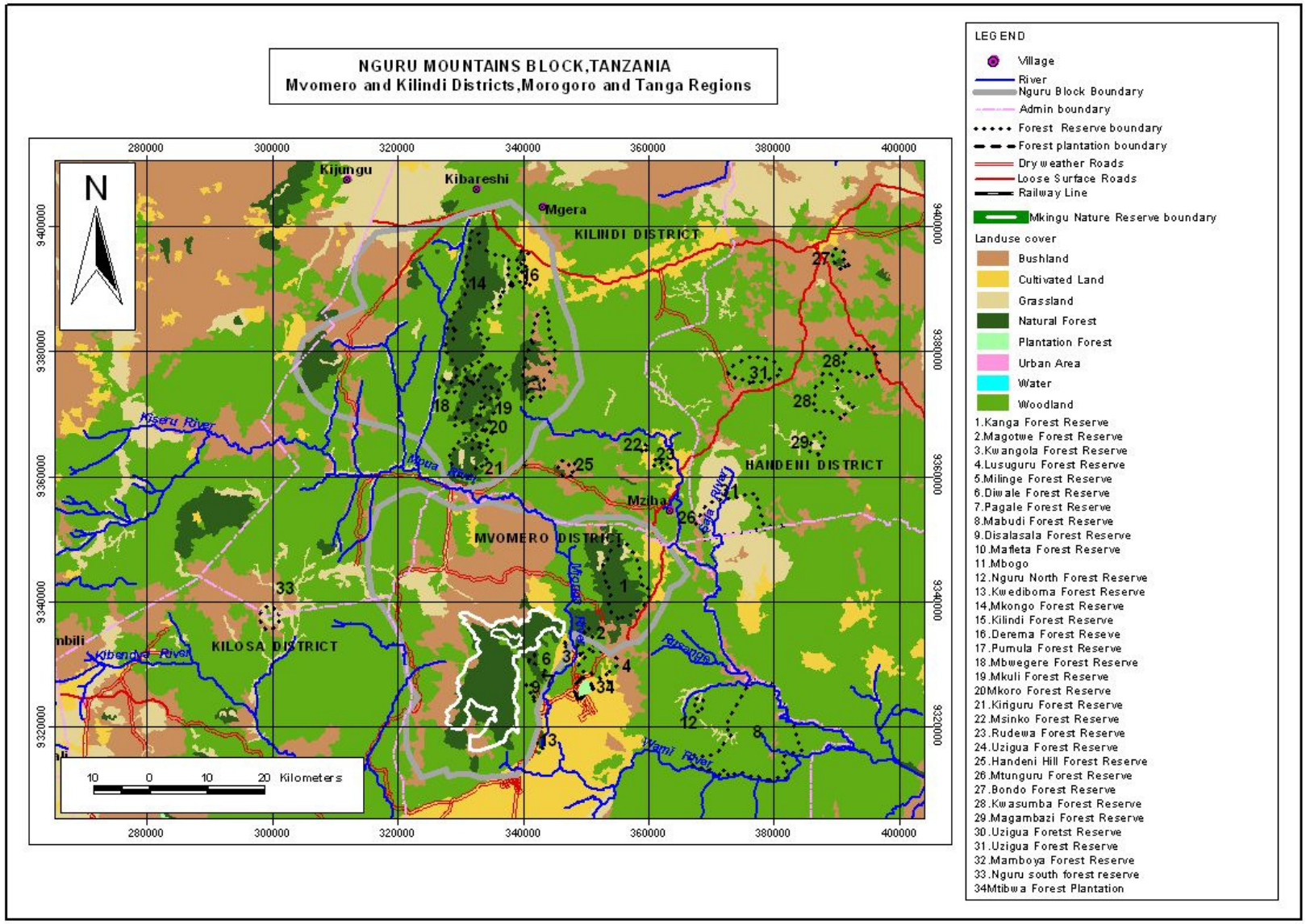


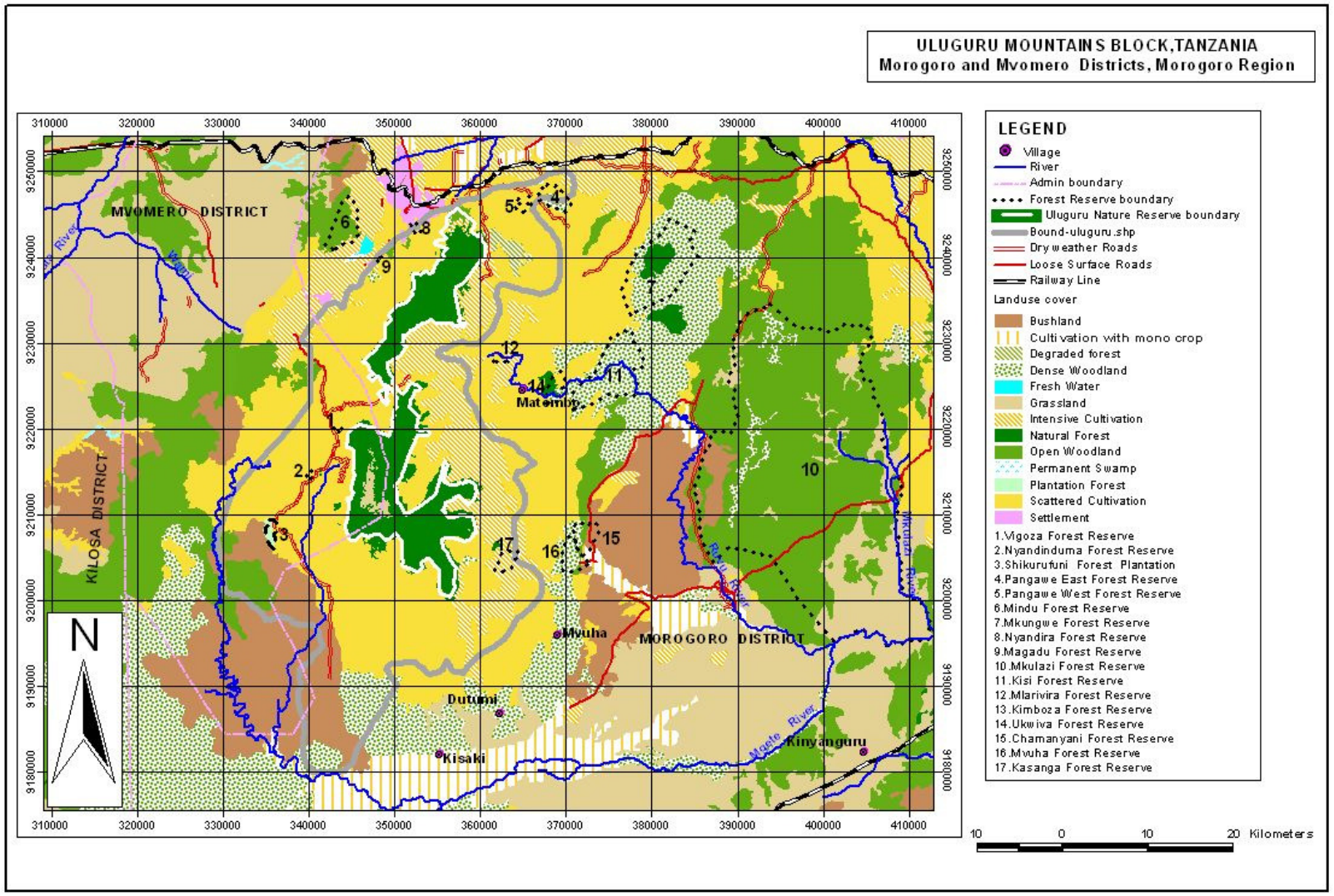
Map 3: West Usambara Mountains Block, with Magamba proposed Nature Reserve



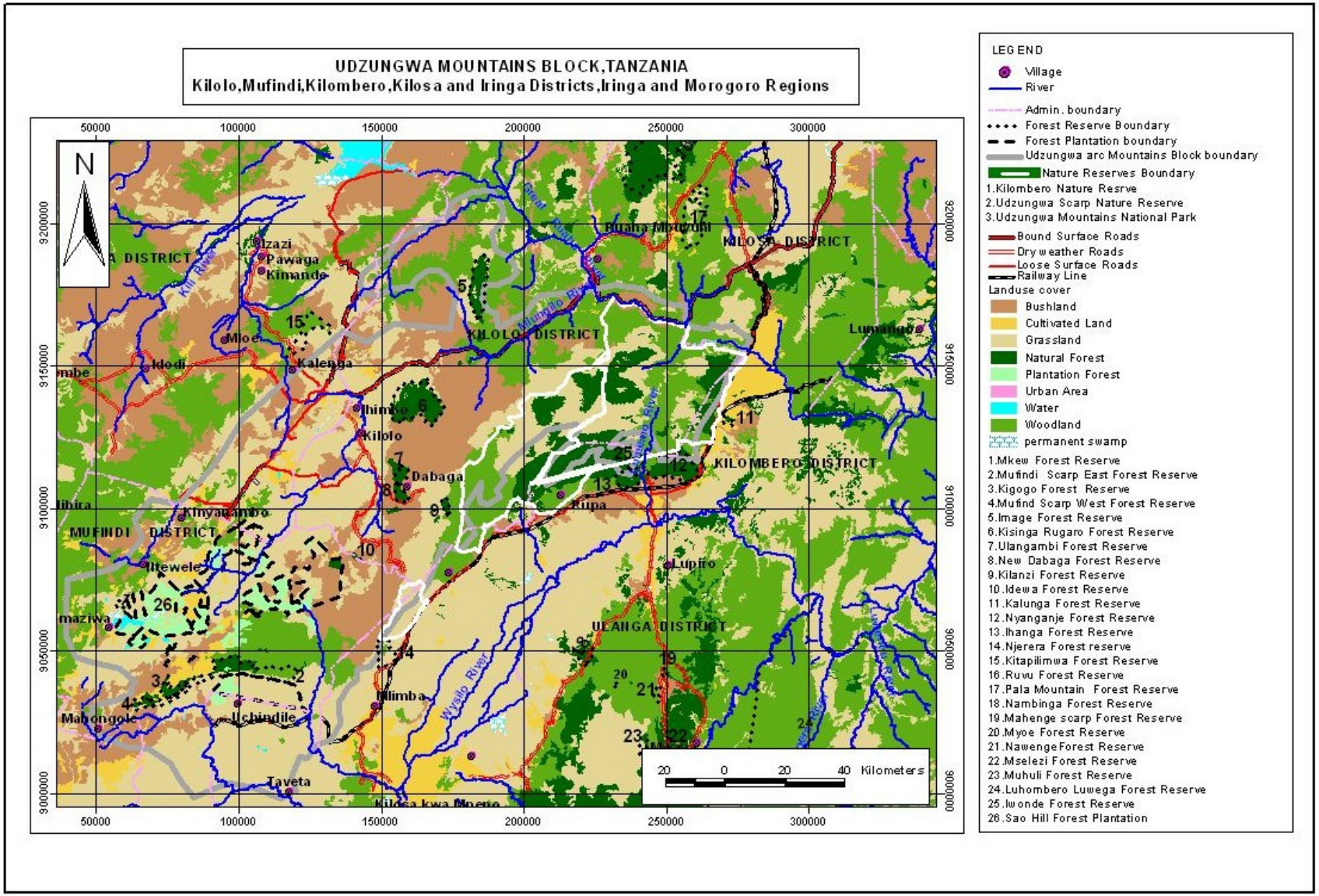
Map 4: East Usumbara Mountains Block, with Amani Nature Reserve and Nilo Nature Reserve



Map 5: Nguru Mountains Block, with Mkingu proposed Nature Reserve



Map 6: Uluguru Mountains Block, with Uluguru Nature Reserve



Map 7: Udzungwa Mountains Block, with Udzungwa National Park, Kilombero Nature Reserve and Uzungwa proposed Nature Reserve

1.f Area of nominated property (ha.) and proposed buffer zone (ha.)

The total area of the Eastern Arc Mountains is approximately 2,300,000 ha, of which more than 90% is found in Tanzania. The total core area of the series of nine protected areas in Tanzania nominated for World Heritage inscription is 451,365 ha, representing 19.6% of the Eastern Arc Mountains but covering at least 50% of the remaining natural habitat.

Nominated area, and buffer zone areas for the nine Eastern Arc World Heritage property

Serial No.	Mountain Block	Name of property	Nominated area (ha)	Buffer zone (ha)*	Total area (ha)	Other buffer#	Mountain Block forest buffer## (ha)
01	East Usambara	Amani Nature Reserve	8,380	*1,000	**9,380**	250	13,500
02	East Usambara	Nilo Nature Reserve	6,225	**3,000	**9,225**	250	
03	Nguru	Mkingu Proposed Nature Reserve	23,388	0	**23,388**	1,000	7,373
04	South Pare	Chome Proposed Nature Reserve	14,283	0	**14,283**	250	7,000
05	Udzungwa	Kilombero Nature Reserve	134,511	0	**134,511**	1,000	69,000
06	Udzungwa	Udzungwa Mountains National Park	199,000		**199,000**	1,000	
07	Udzungwa	Uzungwa Scarp Proposed Nature Reserve	32,763	0	**32,763**	250	
08	Uluguru	Uluguru Nature Reserve	24,115	0	**24,115**	250	10,000
09	West Usambara	Magamba Proposed Nature Reserve	8,700	0	**8,700**	3,674	20,000
		Totals	**451,365**	**4,000**	**455,365**	**7,924**	**126,873**

**Buffer zone: ***Derema Corridor (proposed Forest Reserve); ** Segoma, Kambai, Kwamgumi FRs (3,000 ha)

#Other buffer: Comprises local authority and village Forest Reserves in the vicinity of the proposed serial World Heritage property.

##Mountain Block forest buffer: Comprises national Forest Reserves within the Mountain Block.

2. Description

2.a Description of Property

EASTERN ARC MOUNTAINS

The name

The term 'Eastern Arc' was introduced in 1985 to describe the arc of forest-capped ancient crystalline mountains of eastern Tanzania and south-east Kenya, which are under the influence of the Indian Ocean climatic regime and, therefore, contain predictable local climates (Lovett 1985).

Geographical distribution

Thirteen separate mountain blocks comprise the Eastern Arc, covering a total area of approximately 23,000 km^2 of which some 3,500 km^2 is forested. The mountains are separated from each other but, together, they form a broad arc shape of some 600 km in length. Twelve of the 13 mountain blocks are found in eastern Tanzania within 15 Districts and 5 Regions. The other mountain block (Taita Hills) is found in Kenya (Map 1, Executive Summary).

Geology and Geomorphology

The Eastern Arc Mountains were formed by uplifting associated with the Rifting of the African plate which caused the development of the 'Great Rift Valley'. The mountains are at least 30 million years old and are made up of ancient rocks dating from the Precambrian epoch.

The Eastern Arc Mountains rise to a maximum altitude of 2,635 m at Kimhandu peak in the Ulugurus, although more typically the maximum altitudes of different blocks are between 2,200 m and 2,500 m.

The mountain blocks typically rise dramatically from the surrounding plains, often with very steep drops down to the plains, especially on the eastern and southern margins. Some of the larger blocks have flat tops, which are slightly undulating. There are many rocky outcrops throughout the mountains and fast flowing rivers drain to the lowlands.

The rocks of the Eastern Arc are highly deformed after hundreds of millions of years of uplift, erosion and further uplift. They comprise a mixture of migmatites and granites, with numerous quartz veins. The rocks are all base poor and weather to form a nutrient poor and generally sandy soil that is suitable for agriculture, but is not very productive. Only in areas that have been more recently covered by forest, and hence have higher humous content, are the soils good for agricultural productivity. These areas are typically located at higher altitudes where the rainfall is also more conducive for agriculture.

Climate regime

The Eastern Arc Mountains are under the direct climatic influence of the Indian Ocean, and the climatic regime is believed to have been stable over millions of years, as indicated by biogeographical affinities to the forests of West Africa, Madagascar, and Asia. The Arc forests survived the driest and coldest periods of the last ice ages, as the Indian Ocean did not cool appreciably and rainfall patterns may not have been greatly disrupted. Today, the climate in the mountains remains wetter, and less seasonal than the surrounding lowlands.

The Uluguru Mountains receive up to 3,000 mm rain a year on the eastern slopes, and annual rainfall on most other mountains exceeds 1,500 mm in wetter parts. There is, however, some evidence that the climate has become drier and more seasonal in recent decades, with a lower likelihood of the forests being enveloped in mist.

Although the mountain soils are not rich, being old and leached in character, they are often better for agriculture than those of the surrounding lowlands. The favourable climate and moderately fertile soils have attracted people to the mountains and the area surrounding the Eastern Arc forests support some of the highest population densities in Tanzania.

Habitat types

For millions of the years the forests of the Eastern Arc were connected to lowland forest areas that stretched as far as the Congo Basin to the East. This forest connection was severed as Africa dried out, with final separation within the past 10 million years. Since that time the forests and grasslands of the Eastern Arc have been broadly isolated from other African forest types, and have undergone separate evolutionary paths.

The eastern facing slopes of the Arc Mountains are (or were) forest covered, but most blocks have plateau-like tops (e.g. Pares, West and East Usambaras, Udzungwas and Ulugurus), and the highest of these originally supported montane grasslands/heathlands. The forest formations of the Eastern Arc Mountains have been divided into upper montane (2,635-1,800 m), montane (1,250-1,800 m), sub-montane (800-1,250 m), and lowland (below 800 m). At the lowest altitudes (generally below 800-500 m depending on the block) the forest grades into that more typical of the lowland Coastal Forests of Eastern Africa Hotspot.

The montane forest is characterized by large trees such as *Ocotea usambarensis, Allanblackia usambarensis*, *A. ulugurensis, Ochna holstii*, *Podocarpus latifolius*, *P. falcatus*, *Ilex mitis*, *Cornus volkensii*, *Newtonia buchanii*, *Pachystela msolo*. In the sub-montane forests the timber trees *Khaya anthothea* and *Milicia excelsa* are also present. Rubiaceae and Acanthaceae dominate the shrub and ground layers.

The upper altitudinal limit of forest vegetation is determined by the regular occurrence of frost, and varies between the different mountain blocks. This is around 2,400 m altitude and at this point the forest grades into Afromontane grassland and heathland plant communities with temperate affinities.

Biodiversity

The Eastern Arc Mountains have been identified in all the major analyses of global biological priority based on the available species data. Starting in the 1970s, the 'Eastern Arc Mountains' were identified as a component of the Afromontane archipelago-like regional centre of endemism by White (1983). The Eastern Arc Mountains are also a Global 200 Ecoregion of WWF (Olson and Dinerstein 1998), part of a biodiversity hotspot of Conservation International (Mittermeier et al., 1998; 2004) and part of an Endemic Bird Area of BirdLife International (ICBP 1992; Stattersfield et al., 1998). These studies all indicate the extreme biological importance of the area in global terms. The Eastern Arc is also mentioned in the UNDP-WCMC review of the coverage of World Heritage Sites as an ecoregion where there is no current World Heritage property (Magin and Chape, 2004).

In terms of **plants**, data compiled for this World Heritage nomination suggest there are at least 3,473 species (4,234 taxa) in 800 genera in the Eastern Arc Mountains, of which at least 453 species (554 taxa) and around 40 genera are believed endemic, including trees, shrubs and herbs. There are also high rates of endemism in the non-vascular plants, with 32 known endemic bryophytes. Endemic plants are not only found in the forests, but also in the montane grasslands, wetland areas, rocky outcrops, and in the drier 'rainshadow' (west and north) areas.

Vertebrates comprise several hundred species, of which at least 118 are endemic to the Eastern Arc Mountains. There are over 50 Eastern Arc endemic species of **amphibians**, concentrated in the reed treefrogs (*Hyperolius*), forest treefrogs (*Leptopelis*), viviparous toads (*Nectophrynoides*), narrow-mouthed frogs (family Microhylidae), and caecilians. The Eastern Arc Mountains are home to 50% of the members of the caecilian family, Scolecomorphidae, among which the genus *Scolecomorphus*, with three species, is endemic. New species of amphibians continue to be discovered in the Eastern Arc Mountains.

At least 32 species of **reptiles** are endemic to the eastern Arc Mountains, the majority of these being chameleons in the genera *Chamaeleo, Rhampholeon* and *Kinyonga*. Reptile endemism is particularly high for an

African mountain system as cool and moist habitats are not ideal for exothermic reptiles. New species of reptiles also continue to be discovered in the Eastern Arc Mountains.

There are 21 Eastern Arc endemic species of **birds** and four endemic genera (*Xenoperdix, Sceptomycter, Modulatrix*, *Swynnertonia*). Some bird species have extremely limited distributions, for example the Taita thrush (*Turdus helleri,* CR*)* and Usambara akalat (*Sheppardia montana,* CR) occur only in a few square kilometres of forest in the Taita Hills and West Usambaras, respectively. In addition, the Uluguru bush-shrike (*Malaconotus alius*, CR) is confined to one nature reserve in the Uluguru Mountains, with less than 100 km^2 of suitable habitat remaining. Some bird species have disjunctive distribution patterns covering parts of the Eastern Arc, the Southern Rift and the Zimbabwe Highlands; for example, the monotypic genus *Swynnertonia* and the Long-billed tailorbird (*Orthotomus moreaui*).

Eastern Arc **mammals** total 12 endemic species, including three species of primate, the Sanje mangabey (*Cercocebus sanjei,* EN), Udzungwa red colobus (*Procolobus gordonorum,* EN), and the Mountain dwarf galago (*Galagoides orinus*). There are also newly described species in the Eastern Arc, such as the giant elephant shrew (*Rhynchocyon udzungwensis*, VU), the shrew Congosorex phillipsorum (CR) and the near-endemic highland mangabey (*Rungwecebus kipunji*, CR), which is also a new genus of monkey.

The Eastern Arc Mountains also support an **invertebrate fauna** that is exceptionally rich in endemic species, although it remains poorly known. Information on spiders and millipedes indicate that up to 80% of invertebrate species (and many genera) may be strictly endemic to a single mountain. These patterns seem to be repeated across other invertebrate groups, including butterflies. There are 78 butterfly species are either endemic (43) or near-endemic (35) to the Eastern Arc. Among the dragonflies are two species strictly endemic to the East Usambaras.

A summary of the diversity of plants and vertebrates recorded known to occur within the Eastern Arc Mountains is provided in **Table 1**. Lists of plant and animal taxa endemic to the Eastern Arc Mountains are provided in **Annexes 1 and 2**, respectively, including information on their distribution with respect to the different mountain blocks.

Table 1 Number of plants and vertebrates endemic to the Eastern Arc Mountains and to single mountain blocks within the Eastern Arc Mountains (Source: compiled from data used for this nomination)

Mountain Block	Vertebrates			Plants	
	Single block endemic animals	EA endemic animals	Threatened animals	Single block endemic plants	EA endemic plants
East Usambara	7	32	35	36	123
Mahenge	1	8	12	11	48
Malundwe	0	1	0	0	3
North Pare	0	4	3	1	6
Nguru	14	44	26	28	137
Nguu	0	9	11	0	0
Rubeho	2	19	24	1	37
South Pare	1	8	5	6	54
Taita	6	6	4	9	36
Udzungwa	19	44	50	77	221
Ukaguru	3	11	13	5	36
Uluguru	12	39	37	80	211
West Usambara	4	21	24	37	144

Changes in habitat coverage over time

Since the evolution of modern humans and the initiation of agriculture a couple of thousand years ago in this region, the mountains of the Eastern Arc have become favoured places for settled agriculture as they have stable climates and moderate soils. Over the past hundreds of years the forest and grassland on many areas of the Eastern Arc has been slowly cleared and replaced by farmland, and today more than 70% of the former habitat has been lost.

The remaining natural forest on the Eastern Arc Mountains was around 3,500 km^2 in the year 2000. This has declined from around 4,750 km^2 in 1955 and perhaps as much as 18,000 km^2 in historical times (**Table 2**). These data are complete up to c.2000. Partly completed updating of these forest cover data to 2008 shows that forest loss has continued, but full results are not yet available. However, the largest areas of loss are believed to have occurred in sub-montane forests in the Uluguru and East Usambara, and in montane forests in the Ukaguru and Rubeho ranges. Elsewhere forest loss has been small.

The decline in forest area has also been accompanied by an increase in fragmentation. The number of forest fragments increased from 852 in 1955 to 1,468 in 2000, even though forest area only declined by 15% over this period. In most areas in the Eastern Arc the isolation of the remaining forest patches (largely within reserves) is complete and the forests are now entirely surrounded by farmland with little chance of the forests being re-connected. In some other areas there remains fragments of natural forest or grassland habitats between existing reserves and in these places FBD is often working to create new reserves to maintain the forest connectivity. Examples of this are in the Derema forest corridor in the East Usambara Mountains, the Mngeta forest corridor in the Udzungwa Mountains, the Bunduki Gap forest corridor in the Ukaguru Mountains, and some smaller potential forest corridors in the East Usambara Mountains.

Table 2 Forest area in the Eastern Arc Mountains over time (from Hall et al., 2009)

Eastern Arc Mountain Block	Forest Cover across time (km^2)			
	Paleo.	1955	1975	2000
East Usambara	830	425	299	263
Mahenge	557	35	24	24
Malundwe	37	9	6	9
Nguru	920	**313	313	297
Nguu	668	207	198	188
North Pare	323	36	27	26
Rubeho	2,648	652	532	477
South Pare	1,088	195	147	139
Udzungwa	5,861	1,745	1,402	1,354
Ukaguru	1,076	200	181	167
Uluguru	1,620	338	321	279
West Usambara	2,364	579	348	323
Total	**17,992**	**4,734**	**3,798**	**3,546**

**1955 data on Nguru unavailable due to lack of relevant map, so 1975 data have been used.

Human history

The Eastern Arc supports a number of ethnic groups, with single groups found in most of the blocks, with somewhat different languages between the groups. Most of the groups are Bantu peoples, but there are also some Kushitic (in South Pare and West Usambara mountains) and Nilotic people in the form of the Masaai and Barabaig who seasonally use some of the Eastern Arc lowland areas.

Human population density

The Eastern Arc Mountains support high human population density. Human densities are often over 200 people per square kilometre, sometimes reaching 300-400 people per square kilometre. These people are all heavily dependant

on the use of natural resources to support their livelihoods, for example they collect firewood and building poles from the forests, and some also undertake logging and mining activities (generally illegally). There is also hunting pressure in many Eastern Arc forests, which in some areas has impacted on large mammal populations mammals to the extent of only smaller species remaining. People also set fires to clear their farmland and these fires further destroy the natural habitats.

Protected forest lands

Central government. The largest amount of the remaining natural habitat on the mountains is found within national Forest Reserves, managed for water catchment and biodiversity conservation, and where forest exploitation is not allowed (Figure 1). Almost 200,000 ha of forest and grassland habitats are also protected within the Udzungwa Mountains National Park which was gazetted from existing Forest Reserves in 1992. Further areas of Forest Reserve have also been, or are in the process of being, upgraded to the status of Nature Reserve; this includes the gazetted Kilombero Nature Reserve in Udzungwa Mountains, Uluguru Nature Reserve in Uluguru Mountains, Nilo Nature Reserve and the Amani Nature Reserve in the East Usambara Mountains.

Four other Nature Reserves are in the process of being legally established: Uzungwa Scarp in the Udzungwa, Mkingu in the Nguru, Magamba in the West Usambara and Chome in the South Pare. When these are all gazetted (expected during 2010) then the largest area of natural habitat within the Eastern Arc will be found under the category of Nature Reserve, managed by the Forestry and Beekeeping Division (**Figure 1**). Small areas of forest are also included within the Mikumi and Mkomazi National Parks but, as the total area of Eastern Arc forest in these protected areas is less than 1,000 km in each case and the majority of the habitat is savannah woodland, these are not considered further.

In terms of IUCN protected area category, FBD has classified its 4 Nature Reserves and 83 Forest Reserves (covering 656,815 ha) in accordance with the IUCN Protected Areas Management Categories system. Most of these sites have been allocated to IUCN Category IV (Habitat/Species Management Area), with a few to IUCN Category 1a (Strict Nature Reserve) and 1b (Wilderness Area), and some to IUCN Category VI (Managed Resource Protected Area). The Udzungwa Mountains National Park is classified as Category II (National Park). All these sites are included in the World Database of Protected Areas maintained by UNEP-WCMC in Cambridge, U.K.

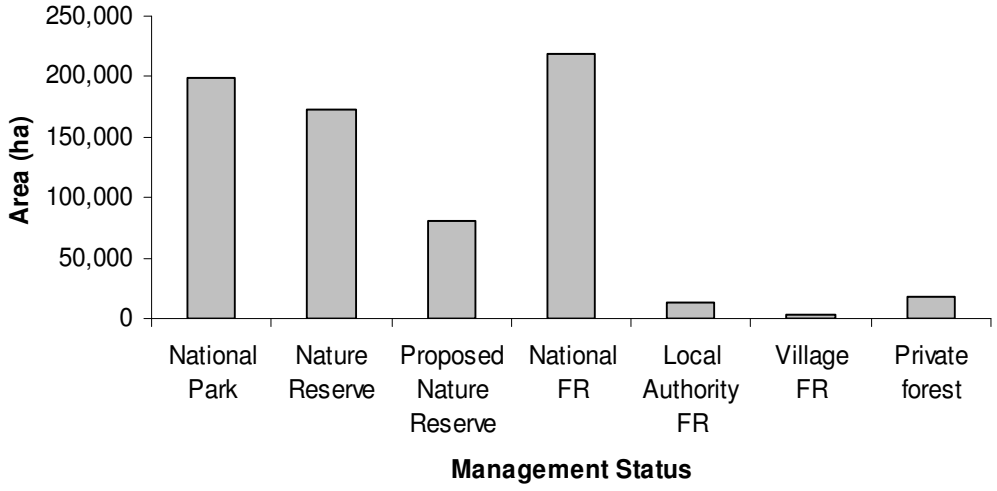


Figure 1 Land under different categories of reserve and ownership within the Eastern Arc Mountains (January 2010). Lowland forests transitional between Eastern Arc and coastal forest types have been excluded.

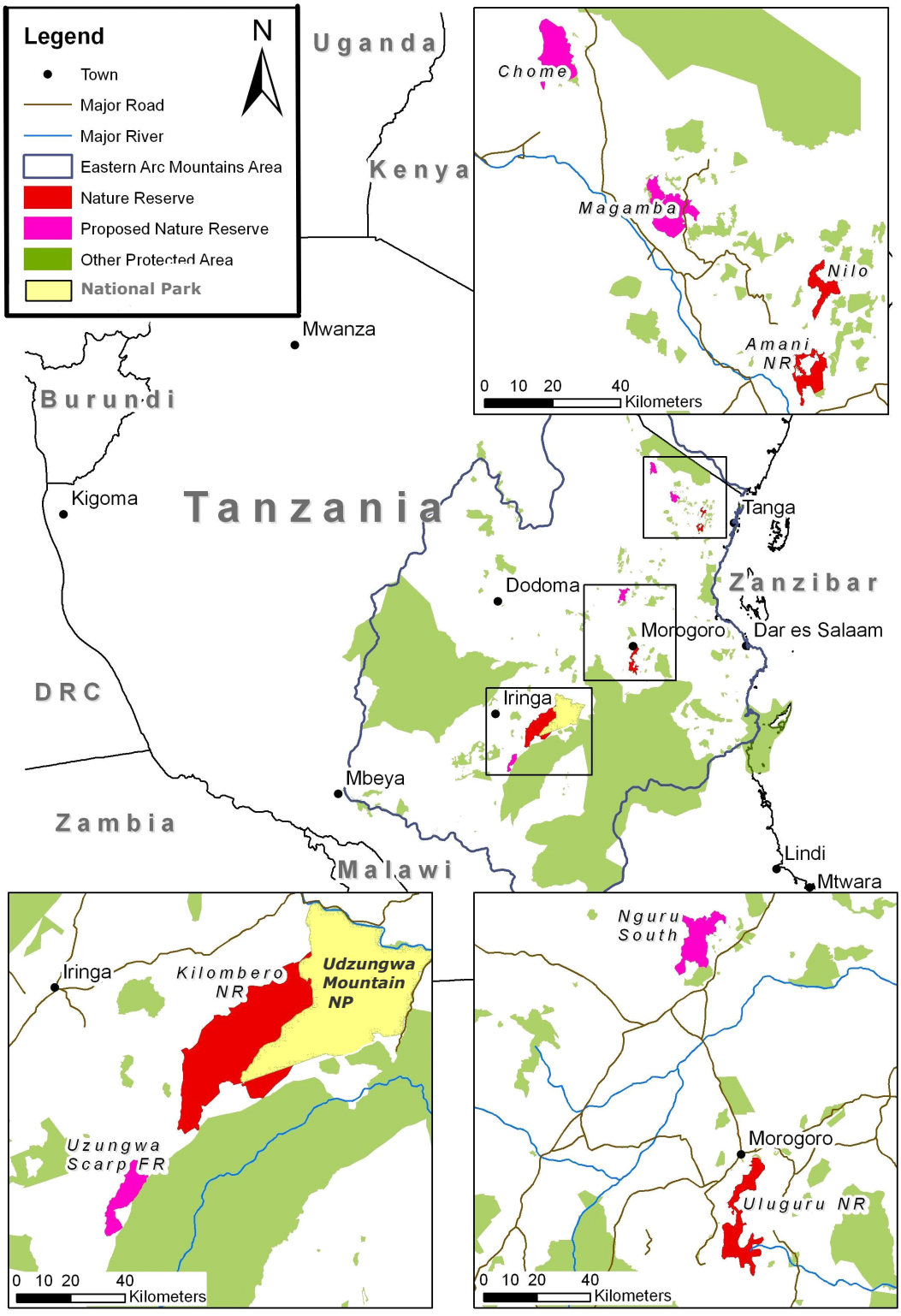


Figure 2 Distribution of Nature Reserves, proposed Nature Reserves and National Park within the Eastern Arc Mountains

Other forest management regimes

Other forest management regimes amount to a relatively small amount of the total forest (**Figure 1**). However, they fulfil an important 'buffer' role, meeting to a significant extent the livelihood needs of local communities and, thereby, helping to reduce pressures on the national forest reserves and national park. They are described briefly below.

District. District authorities, under the Prime Ministers Office for Regional and Local Government, also own forests within reserves across the Eastern Arc Mountains. In total there are 13,814 ha of Local Authority Forest Reserves in the Eastern Arc Mountains region. Typically, these are small reserves with few biological values.

Village. Several hundred villages are distributed across the Eastern Arc Mountains. In many of these villages there are small patches of forest. Village Land Forest Reserves cover 298,897 ha of forest habitat. Other areas of forest are either Sacred Forest areas, or uncultivated forest land.

Private. There are areas of forest on private lands throughout the Eastern Arc Mountains, in particular on tea estates in the East and West Usambara and the Udzungwa Mountains. These forest areas are not considered this serial nomination, with one exception (Amani Nature Reserve), because of management constraints.

The distribution of the nationally designated protected areas is shown in **Figure 2**. Outside of this network of protected areas in the Eastern Arc Mountains, most forest has been cleared except in small village burial and other sacred sites, a number of district and village Forest Reserves and private estates (as considered above), and inaccessible areas. A list of protected forest lands within the Eastern Arc Mountains is provided in **Annex 3**.

IDENTIFICATION OF CORE AREAS TO INCLUDE IN THE SERIAL PROPERTY

As intimated in the introductory section explaining the nomination process, comprehensive databases of plant and animal species endemic to the eastern Arc Mountains were used to identify the most important of the 13 mountain blocks and the most outstanding protected areas within them for inclusion within this serial nomination. This and other information, concerning site integrity and state of protection and management, was assessed in relation to OUV (Outstanding University Value) criteria, to define the World Heritage property.

Selection of Mountain Blocks

The results of an analysis of plant and vertebrate data concerning the known distribution species endemic to the Eastern Arc Mountains are shown in **Figures 3 and 4**. The 13 mountain blocks are ranked according to the number of species confined to a single mountain block (block endemic).

Taken together, the results of the analyses are largely complementary and show that the most important mountain blocks for endemic plants and vertebrates in Tanzania are Uluguru, Udzungwa, East and West Usambara, and Nguru. Biodiversity within each of these mountain blocks is protected to some extent within one or more nature reserves (a number of which are in the process of being notified during 2010) and, in the case of the Udzungwa Mountains, a national park. None of the other mountain blocks currently has any natures reserves (or national parks), except for South Pare where Chome is due to be notified as a Nature Reserve in 2010.
This assessment is further supported by the results of an analysis of endemic and near endemic[1] threatened[2] vertebrates found in the different mountain blocks (**Figure 5**). Blocks with the highest numbers of threatened species are Udzungwa, Uluguru, East Usambara, Nguru, West Usambara and Rubeho.

[1] Near-endemic is defined as also occurring within one other African ecoregion (Burgess et al., 2007).
[2] The term threatened is used in the case of species classified as Critically Endangered, Endangered or Vulnerable in the IUCN Red List (2009).

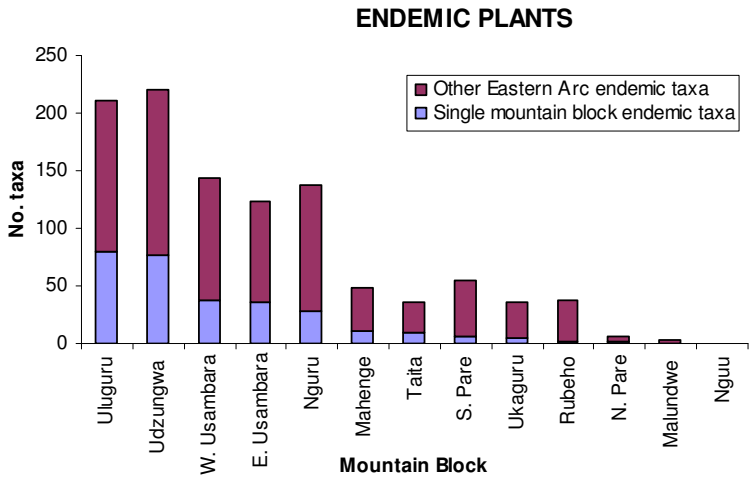


Figure 3 Importance of Eastern Arc mountain blocks for plants, ranked according to the number of plant taxa endemic to each block. Also shown is the total number of endemic plant taxa present in each block.

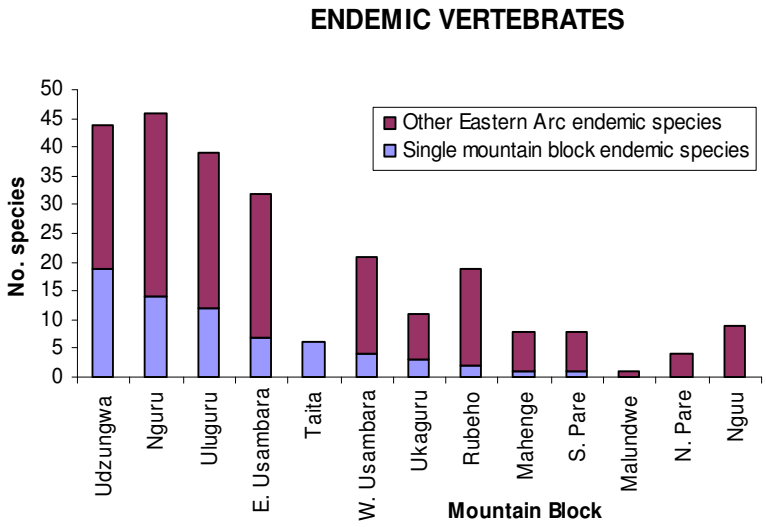


Figure 4 Importance of Eastern Arc mountain blocks for vertebrates, ranked according to the number of species endemic to each block. Also shown is the total number of endemic vertebrates present in each block.

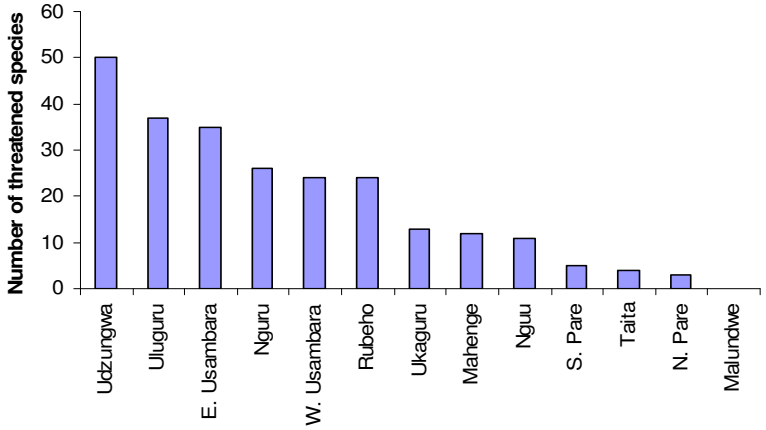


Figure 5 Importance of Eastern Arc mountain blocks for threatened endemic and near-endemic vertebrates

This assessment is further supported by the results of an analysis of endemic and near endemic[3] threatened[4] vertebrates found in the different mountain blocks (**Figure 5**). Blocks with the highest numbers of threatened species are Udzungwa, Uluguru, East Usambara, Nguru, West Usambara and Rubeho.

Based on the above considerations, **Uluguru, Udzungwa, East and West Usambara, Nguru and South Pare have been selected for representation by protected areas in the serial nomination**. South Pare is included in order to provide for a greater spatial distribution of mountain blocks (Map 1, Executive Summary), given the forthcoming notification of Chome Nature Reserve which is also an Important Bird Area.

Selection of sites

The same set of data for Eastern Arc Mountain endemic plants and vertebrates was used to identify individual protected areas for inclusion in the serial nomination. In the case of vertebrates it was possible to identify the total number of endemics within a given site, as well as endemics found only in that site. For plants the analysis was limited to single site endemics as data held in the TROPICOS database, maintained by Missouri Botanical Gardens, are currently not organised to provide total numbers of species recorded from an individual site.

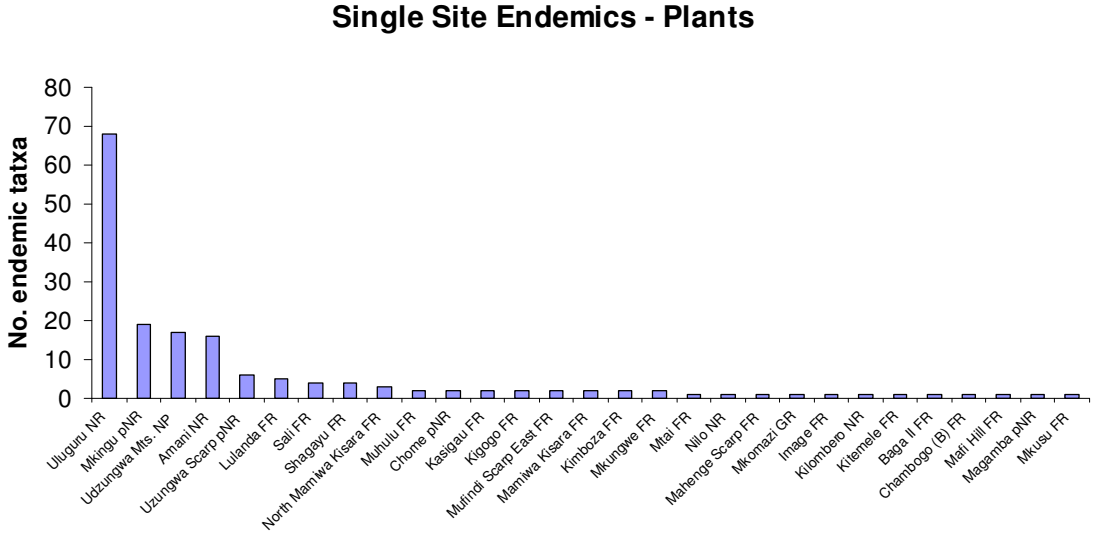


Figure 6 Importance of Eastern Arc protected areas for plants, ranked according to the number of taxa endemic to each block.

Results from an analysis of these data are shown in **Figures 6 and 7**, respectively, for Eastern Arc endemic plants and vertebrates, with protected areas ranked according to the number of species confined to a single site (single site endemic). The most important protected areas for single site endemic plants are Uluguru Nature Reserve, with an exceptionally high number of 68 species endemic to the site, Mkingu proposed Nature Reserve and Amani Nature Reserve. In the case of single site endemic vertebrates, the most important protected areas in Tanzania are Mkingu proposed Nature Reserve, Uluguru Nature Reserve, Uzungwa Scarp proposed Nature Reserve, Amani Nature Reserve, Udzungwa Mountains National Park and Kanga Forest Reserve. Also notable is Taita Hills in Kenya (ranked third with respect to site endemics), which is exceptional given its small extent of forest (approximately 12 km^2). Next in importance are Kilombero and Nilo Nature Reserves, with fewer site endemics but a comparatively high complement of endemic species, followed by Chome and Magamba proposed Nature Reserves, and 2 Forest Reserves (Mamiwa Kisara and Sali) and 1 private estate (Mazumbai).

[3] Near-endemic is defined as also occurring within one other African ecoregion (Burgess et al., 2007).
[4] The term threatened is used in the case of species classified as Critically Endangered, Endangered or Vulnerable in the IUCN Red List (2009).

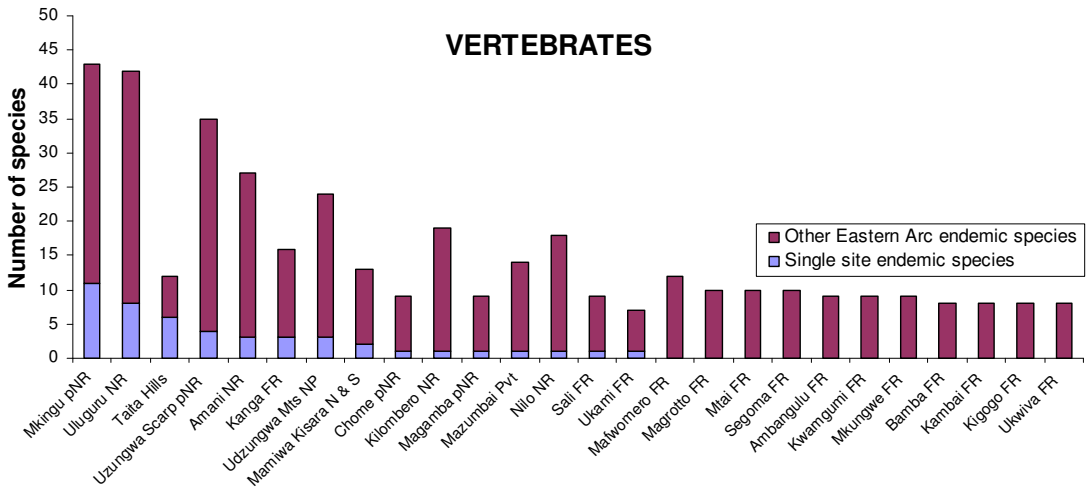


Figure 7 Importance of Eastern Arc protected areas for vertebrates, ranked according to the number of species endemic to each site. Also shown is the total number of endemic vertebrates for each protected area.

The 8 nature reserves (Mkingu, Uluguru, Uzungwa Scarp, Amani, Kilombero, Nilo, Chome and Magamba) and 1 national park (Udzungwa Mountains) have been selected for inclusion in the serial nomination, based on the above considerations, their nature conservation designation and their comparatively larger sizes (see Annex 3). Within these 9 protected areas are found 77% of the 170 single-site endemic plant taxa, 70% of the 47 single-site endemic vertebrates and 76% of the 118 vertebrates endemic to the Eastern Arc Mountains.

This series of core areas that comprise the World Heritage nomination are spatially well distributed across the Eastern Arc Mountains (Map 1, Executive Summary) and feature much of the Outstanding Universal Value that is contained within these Mountains.

Future additions to the series

Biological surveys are not evenly distributed across the Eastern Arc Mountains, despite the huge investments of time and resources in the last few decades. Amongst the sites included in this serial nomination, Amani, Nilo, Uluguru, Mkingu and Kilombero nature reserves have all been intensively surveyed for biodiversity. However, Chome, Magamba and Uzungwa Scarp proposed nature reserves and the Udzungwa Mountains National Park have not been so intensively investigated and this may have influenced their ranking in Figures 6 and 7.

There are also some well-surveyed reserves that do not rank highly in the assessment (Figures 6 and 7) and these are not expected to be found of critical importance with respect to the World Heritage List, even with further surveys. Such sites include the forest in North Pare Mountains and most of the forests in the Mufindi portion of the Udzungwa Mountains.

Other mountain blocks of potential global importance for biodiversity include Mahenge, Ukaguru, Rubeho and, in Kenya, Taita Hills, all of which support a small number of plant and vertebrate species endemic to a single mountain block (Figures 3 and 4). Other fairly well-surveyed sites in Tanzania of potential Outstanding Universal Value for biodiversity are: Sali Forest Reserve (Mahenge Block), Mafwomero Forest Reserve (Rubeho), Mamiwa-Kisara Forest Reserve (Ukaguru), Kanga Forest Reserve (Nguru), and the gradation to lowlands in Derema / Kwamgumi / Segoma / Kambai forest reserves (East Usambara). These sites fall within the aforementioned mountain blocks or, in the case of East Usambaras, are already represented within the serial nomination. However, all of these sites lack adequate legal protection status and management provisions and, therefore, do not merit inclusion in the Eastern Arc Mountains Forests serial property at this time. It is anticipated that these and perhaps some other reserves will merit inclusion in the serial property at an appropriate time in the future. There is also the potential for this serial property to become a transnational serial property, with the addition of the Taita Hills by the Government of Kenya.

SOUTH PARE MOUNTAIN BLOCK

This mountain block is wholly confined to Same District in Kilimanjaro region. It reaches up to 2,463 m altitude. The area is heavily populated with about 94,837 people distributed across 49 villages in the highlands. Most of the land outside the government reserves and village and traditionally managed forest patches is farmland.

The forest habitat ranges from sub-montane to montane and upper montane, with areas of montane heath in Chome. Common tree species include *Parinari excelsa* in the sub-montane forest and species such as *Octotea usambarensis, Albizia gummifera* and *Podocarpus latifolius* in the montane forests.

Biodiversity
The biodiversity values of the South Pare Mountains are moderate with 1 strictly endemic vertebrate animal, the South Pare white-eye (*Zosterops winifredae*) and eight other vertebrate species that are confined to the Eastern Arc Mountains. Similar moderate rates of endemism are seen in plants, with six vascular reports endemic to the South Pare. The Chome forest has been fairly well surveyed for biodiversity, but the other forests are not known. In particular there has been little study of the amphibians and reptiles.

Threats
The Chome forest reserve has been logged over many years for its valuable timber species, but intense efforts by the government have brought the situation under some control. The higher staffing levels afforded by the status of Nature Reserve, when declared, will further address this issue in the future. Fire is also a management challenge in the South Pare Mountains, and when forests are damaged by fire they can be invaded by the alien tree species black wattle and Eucalyptus.

Core elements of the World Heritage property. Chome proposed Nature Reserve, which covers some 14,282 ha.

Buffer elements of the World Heritage property. Immediately surrounding Chome are some small local authority Forest Reserves: Chongweni, Gonja and Kankoma. These reserves total around 250 ha.

Other reserves in the South Pare Mountains. The following reserves also contain natural habitat: Chambogo, Kiranga-Hengae, Kankoma, Kisiwani, Vumari, Kwizu, Maganda, two proposed Forest Reserves (Kwamwenda, Mwala) and three proposed Village Forest Reserves (Dido, Mambugi, Ishereto) supporting Eastern Arc forest. These total around 7,000 ha.

CHOME PROPOSED NATURE RESERVE

Name of site:	Chome
Designation:	Forest Reserve
	Proposed Nature Reserve
Gazette notification:	Government Notice No. 125 (Boundary maps: JB 338, JB 339 and JB 340, 1957)
Date of notification:	25/5/1951 (followed by Variation Order No. 303 of 20/6/1958)
Land ownership:	Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism
Area (ha):	14,283 ha

Location

Centre point:	Between 4^0 10' - 4^0 24 South and 37^0 53` - $38^0$ 00` East
Districts:	Same
Mountain Block:	South Pare

Brief description

Geography:	Chome lies on the highest ridges and plateau of the ancient crystalline South Pare Mountains, which are rich in mica deposits, with rock faces exposed at higher altitudes. Basement rocks are gneiss and magmatite pre-Cambrian crystalline. The Reserve has a high catchment value due to the high rainfall and its extensive forest cover.
Settlements:	Surrounded by 27 villages, with a total population of 60,916 (2008) whose main activities are agriculture and subsistence livestock farming.
Altitudinal range:	1,250 – 2,463 m (Mt Shengena, the highest peak of South Pare)
Climate:	Estimated annual rainfall is 1,400 mm. The short rains are between November and December and long rains between March and May. Eastern slopes receive more rainfall than western slopes, with a mist effect at higher altitudes. Temperature ranges between 15^oC minimum (July) and 20^o C maximum (February).
Vegetation:	Main vegetation types are submontane, montane and upper montane forest. Montane forest occurs above 1,500 m, with a drier type on lower slopes and rainshadow areas, and a wetter type covering about 60% of the Reserve mainly on eastern and western slopes of valleys at 2,000 – 2,300m. *Ocotea usambarensis* is the dominant emergent tree, with specimens 45 m in height and 2 m in diameter being common. Moss-covered upper montane forest occurs above 2,300 m, with elfin forest on the highest ridges. Primary heath, dominated by *Erica arborea*, occurs along rocky ridges in shallow, acidic soils; secondary heath and grassland have colonized large areas between 1,600 m and 2,000 m in drier montane forest that have been subject to fires.
Species diversity:	Plant and animal surveys have been undertaken in 1999-2001. Plant collections are entered on the TROPICOS database, maintained by the Missouri Botanical Gardens. Some 20 plant species are of particular interest including: *Manikara bakuzi* which was previously reported from Southern Sudan, Ethiopia, Uganda, Northern and Central Kenya; *Penteria adolf-frederecii* sub sp. *keniensis* which was previously reported only from Kenya, with a tentative record from the Themi River near Arusha; *Melletia oblate* sub sp. *tentesis* and *Coffea fadenii*, which were previously considered endemic to Taita Hills in Kenya; *Manikara obovata* which was known from West and Central Africa, Zambia, Angola and in Tanzania only from Bukoba and Musoma District; *Macaranga modadra* and *Rytigynia unbelluata* which are Guinea Congolean species previously known in Tanzania only from Bukoba, Kigoma and Mpanda District; *Pouteria adolf, friedericii sub* sp. *australis* which was previously reported from the Zambia/Malawi border; and South Western Tanzania and *Mistrostigma usambarensis,* which was considered endemic to the Usambara.

There is remarkable variation in term of species composition between the northern and southern parts of Chome and between leeward and windward sides. Studies also indicate that the western side is richer in species than the eastern side (Phillips, 2000).

Summary of biodiversity values:

Taxonomic group	No. species.	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	*500	not compiled	not compiled	0	not compiled
Amphibians		2	2	0	0
Reptiles		1	0	0	0
Birds	94	3	1	1	1
Mammals		2	2	0	0
Vertebrates		8	5	1	1

*Woody plant species (2001 draft management plan)

Management Plan

Period: 2009/10 – 2013/14

Status: Prepared September 2009 and awaiting approval

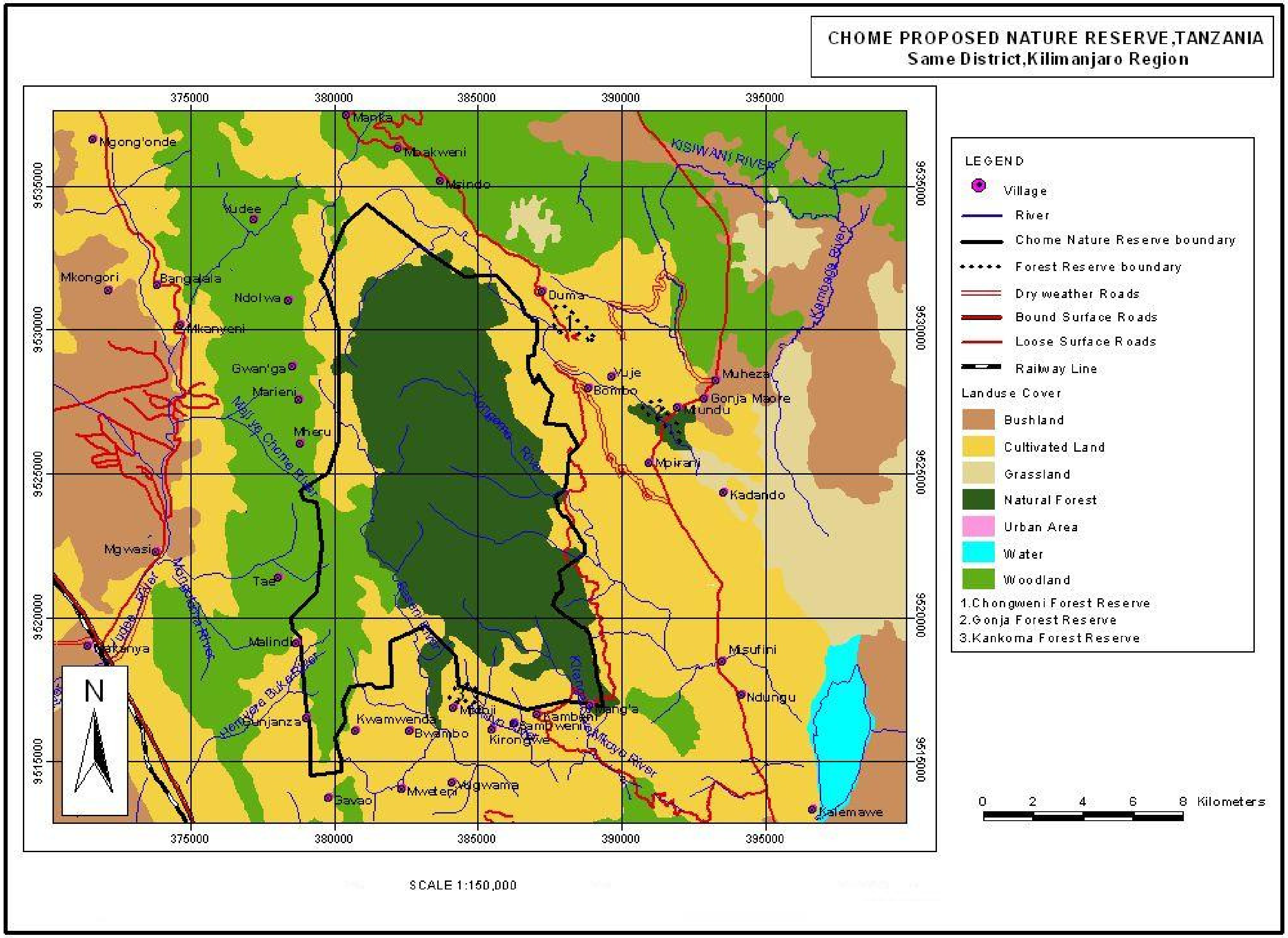
Staffing: Currently there is 11 staff, with 1 conservator, 3 technical officers and 7 forest assistants and beat officers. A total complement of 55 staff is planned for 2010/11.

Budget: The total budget for the five year period is T.Shs 3,368.5 million. The Work Plan for 2009/10 is budgeted at T.Shs 897,459,000.

Goal: The entire Chome proposed Nature Reserve will be managed primarily to protect biodiversity, water catchments and cultural values.

Objectives: There are seven objectives for the proposed Nature Reserve:

- To preserve habitats, ecosystems and species in as undisturbed state as possible.
- To maintain genetic resources in a dynamic and evolutionary state.
- To maintain established ecological processes.
- To safeguard structural landscape features or rock exposures objectives continue.
- To secure examples of the natural environmental for scientific studies, environmental
- monitoring and education, including baseline areas from which all avoidable access is
- excluded.
- To minimise disturbance by careful planning and execution of research and
- other approved activities, and.
- To limit public access.


CHOME PROPOSED NATURE RESERVE,TANZANIA
Same District,Kilimanjaro Region
LEGEND
Village
River
Chome Nature Reserve boundary
Forest Reserve boundary
Dry weather Roads
Bound Surface Roads
Loose Surface Roads
Railway Line
Landuse Cover
Bushland
Cultivated Land
Grassland
Natural Forest
Urban Area
Water
Woodland
1.Chongweni Forest Reserve
2.Gonja Forest Reserve
3.Kankoma Forest Reserve
0 2 4 6 8 Kilometers
SCALE 1:150,000
N
375000
380000
385000
390000
395000
9535000
9530000
9525000
9520000
9515000
Ngong'onde
Manka
Makweni
Msindo
KISIWANI RIVER
Kambaga River
Vudee
Mkongori
Bangalala
Ndolwa
Duma
Mkanyeni
Gwan'ga
Marieni
Vuje
Bombo
Muheza
Gonja Maore
Mhezu
Mpirani
Kadando
Mgwasi
Tae
Malindi
Misufini
Ndungu
Kisanjanza
Kwamwenda
Bwambo
Kirongwe
Mwetemi
Kalemawe
Gavao

WEST USAMBARA MOUNTAIN BLOCK

The West Usambara Mountains are found mainly in Lushoto District, but a smaller area also occurs in Korogwe District. This mountain block ranges up to 2,200m altitude. The area is very highly populated with about 18,1011 distributed over 215 villages. Most land outside of government reserves and small scared forest patches is converted to farmland.

The forests of the area are diverse and range from sub-montane to upper montane in type. These forests are of a wetter type than those of the Pare Mountains further west. Common trees in sub-montane forest are *Newtonia buchananii, Parinari excelsa, Albizia gummifera* and *Allanblackia stuhlmannii*.

Biodiversity
The West Usambara Mountains have high biodiversity value and support four strictly endemic vertebrates (two amphibians and two birds) and another 21 vertebrate species that are only found in the Eastern Arc. There are also 34 vascular plants confined to the West Usambara block. This high biodiversity value is also found in invertebrates. Although biodiversity surveys are probably not complete, some parts of the West Usambara forests have been well studied over the past 100 years.

Threats
In the past areas of natural forest in the West Usambara Mountains were converted to plantations, including within the area being upgraded to the Magamba Nature Reserve. There have also been challenges in the past from illegal logging, gold mining and farmland encroachment. Government is working to address these challenges.

Core elements of the World Heritage property. Magamba proposed Nature Reserve (c. 8,700 ha), which comprises the natural forest parts of the larger former Shume Magamba Forest Reserve (12,225 ha) .

Buffer elements of the World Heritage property. The closest reserve containing natural forest is Mkusu Forest Reserve (3,674 ha), which almost abuts Magamba in a couple of places.

Other reserves in the West Usambara Mountains. There are a number of other reserves in the West Usambaras that will take some pressure off the proposed Magamba Nature Reserve. These comprise 23 gazetted Forest Reserves (Mzinga, Baga – I, Baga –II, Kisima Gonja, Balangai West, Ndelemai, Shagayu, Shume, Mweni Gombero, Kisimagonja, Mahezangulu, Bumba Mavumbi, Kikongoloi, Manka, Bombo Makole, Baghoi, Kwebagu/Hebangwe, Kwenyashu, Shambalai, Mtumbi, Kitara ridge), 11 proposed Village Forest Reserves in Lushoto District (Mzongoti, Chambogo, Kwamongo, Kifulio, Dindira, Shukilai, Sekigoto, Yumbu, Mazashai, Tanda, Deai). There is also one private forest, Mazumbai. and 3 Private (tea estate) forests (Ambangulu, Dindira, Lutindi (KKKT)). In total around 20,000 ha of forest is protected in these ways.

MAGAMBA PROPOSED NATURE RESERVE

Name of site:	Magamba
Designation:	Forest Reserve Proposed Nature Reserve
Gazette notification:	Magamba was originally established as Shume Mgamba Forest Reserve in 1942, subsequently described in GN No. 417, JB 572 of 1963. This site of 12,000 ha was resurveyed in November 2008 with a view to upgrading the natural forest to Nature Reserve status and notifying some 4,000 ha of plantations as Shume-Magamba Plantation Forest. The boundary of the proposed Magamba Nature Reserve is defined in JB 2568.
Date of notification:	Notified as Forest Reserve in 1942; currently scheduled to be notified as a nature reserve in April 2010.
Land ownership:	Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism
Area (ha):	8,700 ha

Location

Centre point:	4°40'S and 38°15'E
Districts:	Lushoto
Mountain Block:	West Usambara

Brief description

Geography:	Magamba is the largest among the 14 forest reserves in Lushoto District that lies within the Eastern Arc Mountains. Geologically, the basement blocks of the Usambaras have been comparatively stable for more than 20 million years (Wiersum *et al*., 1985), believed to contribute to the high biodiversity value of the forest. They comprise a complex series of ancient metamorphic rocks, assigned to the Usambara system of Precambrian rocks. Texturally rock types are grannies, often intruded by quartzite veins. Much repetition of outcrop occurs due to complex fold movements, although the rock sequence tends to be fairly uniform. Slopes are steep to gently undulating and are intersected at their base by narrow flat valleys. Magamba is an important water catchment, with some 28 streams and five dams.
Settlements:	17 villages border the Nature Reserve, comprising a total population of 58,996 (2008).
Altitudinal range:	Altitude ranges from 1650 to the peak of Kwahondo at some 2300 m. The land drops sharply to the west of Shume on the edge of West Usambara scarp (URT, 2003).
Climate:	Cool conditions prevail throughout much of the year, with temperatures ranging between 15°C and 21°C from June to September. Temperature ranges between 25°C and 30°C during the hot season (October – December). Mean annual rainfall is 1200 mm, with long rains from mid-March to May and short rains between October and December..
Vegetation:	Comprises sub-montane and upper montane forests, wetter than those of the Pare Mountains further west. Wet montane forests are dominated by camphor (*Ocotea usambarensis*), with some podo (*Podocarpus usambarensis* and *P. pensiculy*), and have dense undergrowth of *Lansthus cirumilee* and other shrubs. Associated species include *Ficalhoa, Pygium, Rapanea, Fagaropsis* and *Cassipourea*. Dry montane forest occurs in the northern and western portions of Shume and consists mainly of cedar (*Juniperus procera)*, with a thick shrub understorey of *Fuclea*, *Teclea* and *Catha* species (Kiboga & Machange 2005). Other vegetation types include grasslands and shrublands, with heather and *Philippia* sp.

Summary of biodiversity values:

Taxonomic group	No. species*	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	not compiled	not compiled	not compiled	1	not compiled
Amphibians		3	3	0	0
Reptiles		0	0	0	0
Birds		4	2	1	1
Mammals		1	3	0	0
Vertebrates	not compiled	**8**	**8**	**1**	**1**

Management Plan (MNRT 2009b)

Period: 2009/10 – 2013/14

Status: Management plan for Magamba Nature Reserve prepared September 2009 and is approved.

Staffing: Currently 8 staff, of which 7 are Forest Assistants and include 3 serving as Rangers. Recruitment scheduled in the management plan for 2009/10 is 1 Conservator, 4 graduates, 2 Range Officers and 4 Beat Officers. A total complement of 33 staff is planned for 2010/11.

Budget: T.Shs 1.986 billion over 5 years, from which T.Shs 635 million was due to be allocated in 2008/09 and T.Shs 590 million in 2009/10. Income from tourism, sale of confiscated forest products and fines totalled T.Shs 1.9 million in 2007/08. The Norwegian Government has supported projects since 1997/98.

Goal: "To protect and ensure stability of unique habitat for sustainable water flow and increased environmental, cultural and biodiversity values."

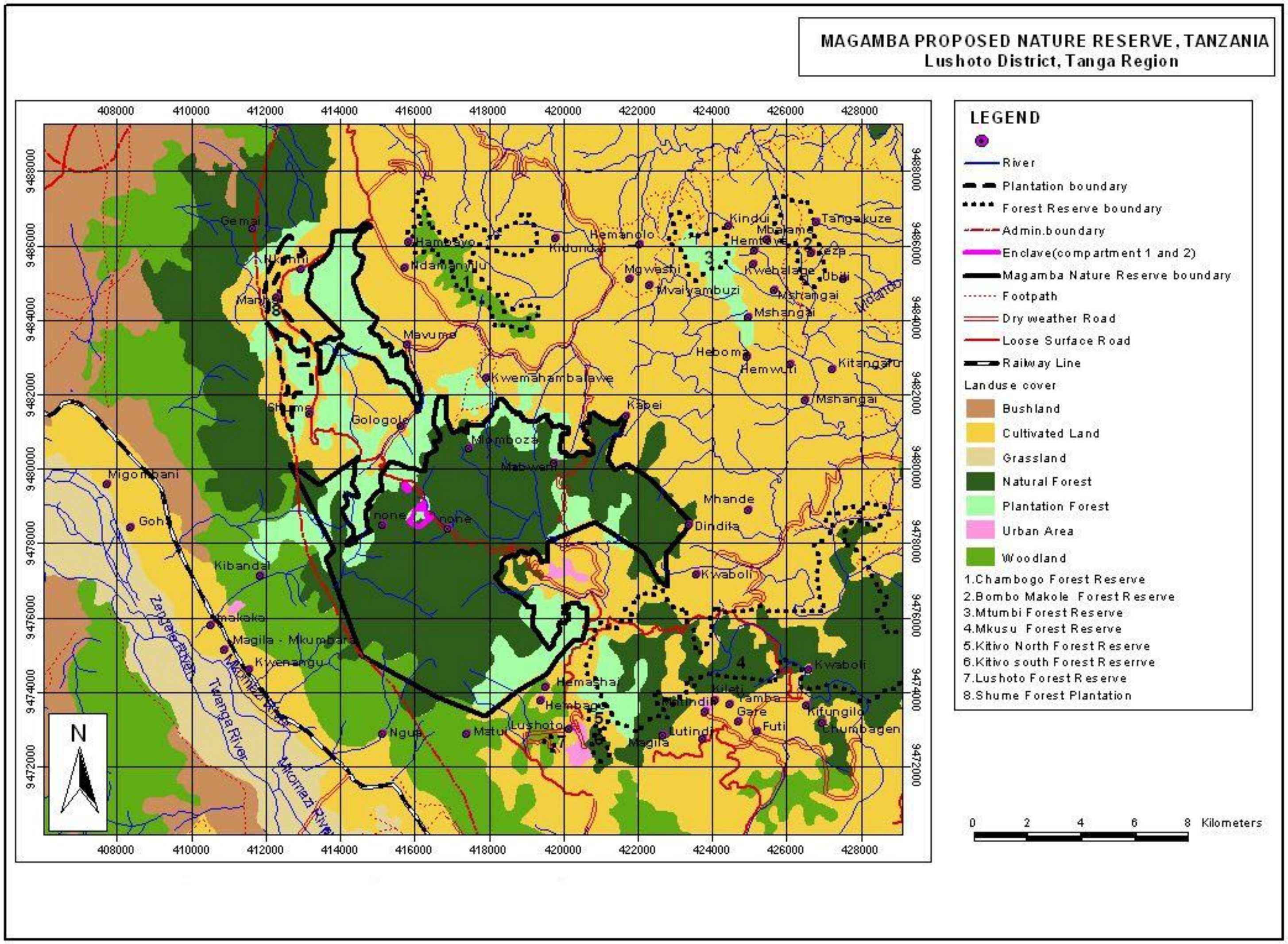
Objectives: To guarantee a permanent and good water supply for domestic, rural and urban use, as well as agricultural, hydroelectric and industrial use.

To conserve the biodiversity of the forest.

To protect unique sites/landscape.

To increase the flow of benefits to local comminities.

To increase returns from efficient management of the reserve.


MAGAMBA PROPOSED NATURE RESERVE, TANZANIA
Lushoto District, Tanga Region
LEGEND
River
Plantation boundary
Forest Reserve boundary
Admin.boundary
Enclave(compartment 1 and 2)
Magamba Nature Reserve boundary
Footpath
Dry weather Road
Loose Surface Road
Railway Line
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Plantation Forest
Urban Area
Woodland
1.Chambogo Forest Reserve
2.Bombo Makole Forest Reserve
3.Mtumbi Forest Reserve
4.Mkusu Forest Reserve
5.Kitivo North Forest Reserve
6.Kitivo south Forest Reserve
7.Lushoto Forest Reserve
8.Shume Forest Plantation
0 2 4 6 8 Kilometers
N

EAST USAMBARA MOUNTAIN BLOCK

The East Usambara Mountains fall within Muheza, Mkinga and Korogwe Districts in Tanga Region. The mountains rise to an altitude of 1,506 m at Mt Nilo. The population is 101,767 people distributed across 61 villages in the areas. Outside of the 13 national reserves in this mountain block the remaining forest is being cleared for farmland, with the exception of the Derema proposed Forest Reserve and some other areas proposed as Village Forest Reserves. Some forest also remains in private land – for example in the lowland Kwamtili estate. The East Usambara Biosphere Reserve, established in 2000, covers a total area of 90,000 ha, of which 30,000 ha is core area and 12,000 ha is buffer zone.

The forests of the East Usambara Mountains range from lowland areas at c.300 m on the east side, through sub-montane forests to the montane forests of Nilo. Tree species composition of these forests varies considerably, but species such as *Khaya anthotheca, Milicia excelsa* are found in the lowlands and others such as *Myrianthus holstii, Albizia gummifera, Allanblackia stuhlmannii* and *Newtonia buchananii* dominate at higher altitudes.

Biodiversity
The East Usambara forests are globally recognised for their exceptional biodiversity importance. The mountain block contains seven endemic vertebrates (three amphibians, one bird, one mammal and two reptiles) and a further 32 species that are confined to the Eastern Arc. There are also 27 vascular plants confined to the block. Similar high rates of endemism are also seen in invertebrate animals. The montane forests grade into lowland forests on the eastern margin of the mountain, and these lowland forests also have exceptional biological importance.

Threats
The challenges facing the forests in the East Usambaras are fire spreading from surrounding farmlands, illegal gold mining and farmland encroachment into ungazetted forests. There are also invasive plant species, for example of the tree *Maesopsis* and various shrubs, herbs and lianas.

Core elements of the World Heritage property. Core areas are Amani (8,300 ha) and Nilo (6,025 ha) nature reserves. There are plans to link Amani Nature Reserve to Nilo Nature Reserve through the proposed Derema Forest Reserve and Segoma and Kambai forest reserves in the lowlands. Moreover, it is planned to expand Kwamgumi Forest Reserve to include natural forest habitats within private estates in the lowlands, and this may be linked to the core area in the future.

Buffer elements of the World Heritage property: No reserves abut Nilo Nature Reserve, the closest being Segoma, Kambai and Kwamgumi Forest Reserves in the lowlands and the proposed Derema Forest Reserve that also adjoins Amani Nature Reserve. Amani Nature Reserve has buffer reserves in the form of teak plantations (Longuza and Kihuhwi), and the proposed Derema Forest Reserve. There are also some forest patches in the tea estate land that abuts the Amani Nature Reserve on the plateau area. These sites cover some 4,000 ha of forest. There are also some Village Forest Reserves in the immediate area. The East Usambara also contains a Biosphere Reserve that has a core area of 30,000 ha of Forest Reserves and Nature Reserves and 12,000 ha of buffer zone.

Other reserves within the East Usambara Mountains: The East Usambara also contains a further 11 Forest Reserves (Bombo West, Bamba, Semdoe, Mtai, Mlinga, Manga, Mlungui, Longuza Teak plantation), 4 Village Forest Reserves (Kizee, Kizangata, Mfundia, Handei), and 2 private forests (Magoroto and Kwamtili). This totals around 13,500 ha of forest.

AMANI NATURE RESERVE

Name of site:	Amani
Designation:	Nature Reserve
Gazette notification:	Amani was created a nature reserve from an amalgamation of six forest reserves (Kwamkoro, Kwamsambia, Mnyuzi Scarp, Amani Zigi, Amani East and Amani West) under Government Notice Nos. 151 and 152.
Date of notification:	8/05/1997
Land ownership:	Forestry and Beekeeping Division of the Ministry of Natural Resources and Tourism
Area (ha):	8,380 ha (This includes 1,065 ha of submontane forest that was donated by the East Usambara Tea Company under a Forest Dedication Covenant in 1997).

Location

Centre point:	Latitude 5° 05' - 5° 14' S and Longitude 38° 40' - 38° 32' E
Districts:	Muheza and Korogwe districts
Mountain Block:	East Usambara

Brief description

Geography:	Amani is the largest forested block within the East Usambara Mountains and occupies the southern extremity of these mountains. The catchment is drained by Zigi River and its tributaries (Nanguruwe, Dondwe Kekuyu and Kihuhwi), which supplies water to Tanga Town as well as Hale and Pangani hydropower stations in the Lwengera Valley. In common with other parts of the East Usambara Mountains, the geology of Amani comprises ancient crystalline rocks, which belong to the Precambrian Usagara system. These are dominated by gneiss, with lesser amounts of granulites and amphibolites. The faulting that resulted in the uplift of the mountain block occurred at least 25 million years ago and, as suggested by the level of endemism, possibly over 100 million years ago.
Settlements:	17 villages lie within the immediate periphery of the Nature Reserve. A further 2 villages lie within enclaves where tea estates, established in the 1940s, continue to operate. The 19 villages comprise a total population of 26,798.
Altitudinal range:	Approximately 300 - 1128 m (Kimbo Peak), with a central plateau having a mean altitude of 930 m. The western side borders Lwengera Valley and rises sharply from lowlands at 150-300 m to form rocky escarpments, such as Mnyuzi Scarp.
Climate:	The proximity (40 km) of the Indian Ocean contributes to a high annual rainfall. Amani is the wettest of all the East Usambara forest blocks, with at least 100 mm rain falling in most months. Monthly rainfall peaks in excess of 300 mm in April-May and reaches about 150 mm in October-December. Mean annual humidity is 87 % in the morning and 77 % at midday. Mean annual temperature at Amani Conservation Centre (900 m) is 20.6°C, with mean daily minimum and maximum temperature of 16.3 °C and 24.9 °C, respectively. The hottest season is January-February and the coolest is July-September.
Vegetation:	The two main forest types are semi-deciduous forests in the lowlands, particularly Mnyuzi Scarp with its lower rainfall, and tall luxuriant submontane evergreen forests in the mountains above 750 m, where rainfall is higher and the largest trees reach 65 m in height. Other biotopes include dry bushland (2%), grassland, barren rocky area and waterbodies (all < 1%). Dense submontane forest covers about half and dense lowland forest about one third of the Nature Reserve. Amani Botanical Gardens (340 ha) lie within the periphery of the Nature Reserve. Established in 1902, it holds over 1,000 species from around the world. This has contributed to some 6 % (520 ha) of former submontane forests having been invaded by exotic species, such as *Maesopsis eminii, Cedrella odorata,* and palm trees.
Species diversity:	Common tree species include *Cephalosphaera usambarensis, Allanblackia stuhlmannii, Albizia gummifera, Beilschmiedia kweo, Diospyros abyssinica, Englerodendron usambarense* and *Drypetes gerrardii*. Epiphytic lichens and bryophytes are abundant especially in steep summits.

Summary of biodiversity values:

Taxonomic group	No. species.	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	not compiled	not compiled	not compiled	16 taxa	not compiled
Amphibians		9	13	2	1
Reptiles		10	4	1	0
Birds		2	3	0	0
Mammals		3	3	0	0
Vertebrates	not compiled	24	23	3	1

Management Plan

Period: 5 years from date of approval

Status: Prepared September 2009; and now approved.

Staffing: Currently (2009/10) 30 staff, 15 of whom are permanent and 15 supported by a range of projects. An increment of 10 supporting staff (1 stores officer and 9 watchmen) is required.

Budget: Expenditure is budgeted at T.Shs 847,167,000 over 5 years. Income from various sources, including funds from external donors, is budgeted at T.Shs 840,824,150. In 2006/07 running costs were T.Shs 200-230 million.

Objectives: "To protect the unique, biologically important sub-montane rain forest ecosystem of the East Usambara Mountains; and

To maintain biodiversity, genetic resources, natural processes and cultural values in an undisturbed, dynamic and evolutionary state in order to have ecologically representative example of the Eastern Arc forest ecosystem available for present and future generations, scientific study, environmental monitoring, education and sustainable and controlled local and recreational use."

NILO NATURE RESERVE

Name of site: Nilo

Designation: Nature Reserve

Gazette notification: Nilo was upgraded from a Forest Reserve to Nature Reserve in accordance with Government Notice No. 234 (Boundary Map JB 2229).

Date of notification: 07/12/2007

Land ownership: Forest and Beekeeping Division, Ministry of Natural Resources and Tourism

Area (ha): 6,225 ha

Location

Centre point: Lies between S 4^0 50'-59' E 38^0 37'-41''and S $4^0$55'00'' E 38^0 40' 00''

Districts: Korogwe, Muheza and Mkinga districts

Mountain Block: East Usambara

Brief description

Geography: Nilo lies in the north-west part of the East Usambara Mountains. Its geology is similar to other parts of the East Usambaras, as described for Amani. Nilo is a Y-shaped ridge system, with an eastern arm that lies close to Semdoe Forest Reserve and a western arm that looks across the Lwengera Valley to the West Usambaras. A central ridge runs along its southern leg towards the proposed Derema Forest Reserve that abuts Amani Nature Reserve. There are two main peaks: Nilo (1,506 m) in the north-west and Lutindi (1,400 m) to the south west, from where there is a 360 degree view of the East and West Usambaras.

Settlements: 16 villages, having a total population of 28,960, surround the Nature Reserve.

Altitudinal range: 400 m – 1,506 m

Climate: Rain falls in all months of the year but peaks bi-modally in March-May and September-December, with intervening drier seasons. Mean annual rainfall is 1,700 mm, increasing from 1,200 mm in the foothills to over 2,200 mm at higher altitudes. West-facing slopes are drier to those exposed to the east. Temperature ranges from 17.6 ^{0}C at higher altitudes to 23.1 ^{0}C in the foothills.

Vegetation: The main vegetation types are: dense montane forest (30% cover) above1,250 m, sub-montane forest (60%) at 850-1,250 m and lowland forest (10%) below 850 m. These percentages are approximate as it is also recorded in the management plan that deforested areas of shrubs and grass cover about 15% of the Nature Reserve. The sub-montane forest can be exceptionally tall and luxuriant, with the largest trees reaching 58 m in height in favourable sites.

Species diversity: Frontier Tanzania (2002) recorded a total of 739 species of woody plants and herbs, representative of 127 families, of which 207 were from vegetation plots and the rest were recorded opportunistically.

Summary of biodiversity values:

Taxonomic group	No. species*.	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	739	not compiled	not compiled	1	not compiled
Amphibians	35	7	12	0	0
Reptiles	41	4	2	0	0
Birds	97	5	5	1	1
Mammals	**47	1	3	0	0
Vertebrates	not compiled	17	22	1	1

*Frontier Tanzania (2002) **Includes 15 species of bats (Frontier Tanzania 2002).

Management Plan

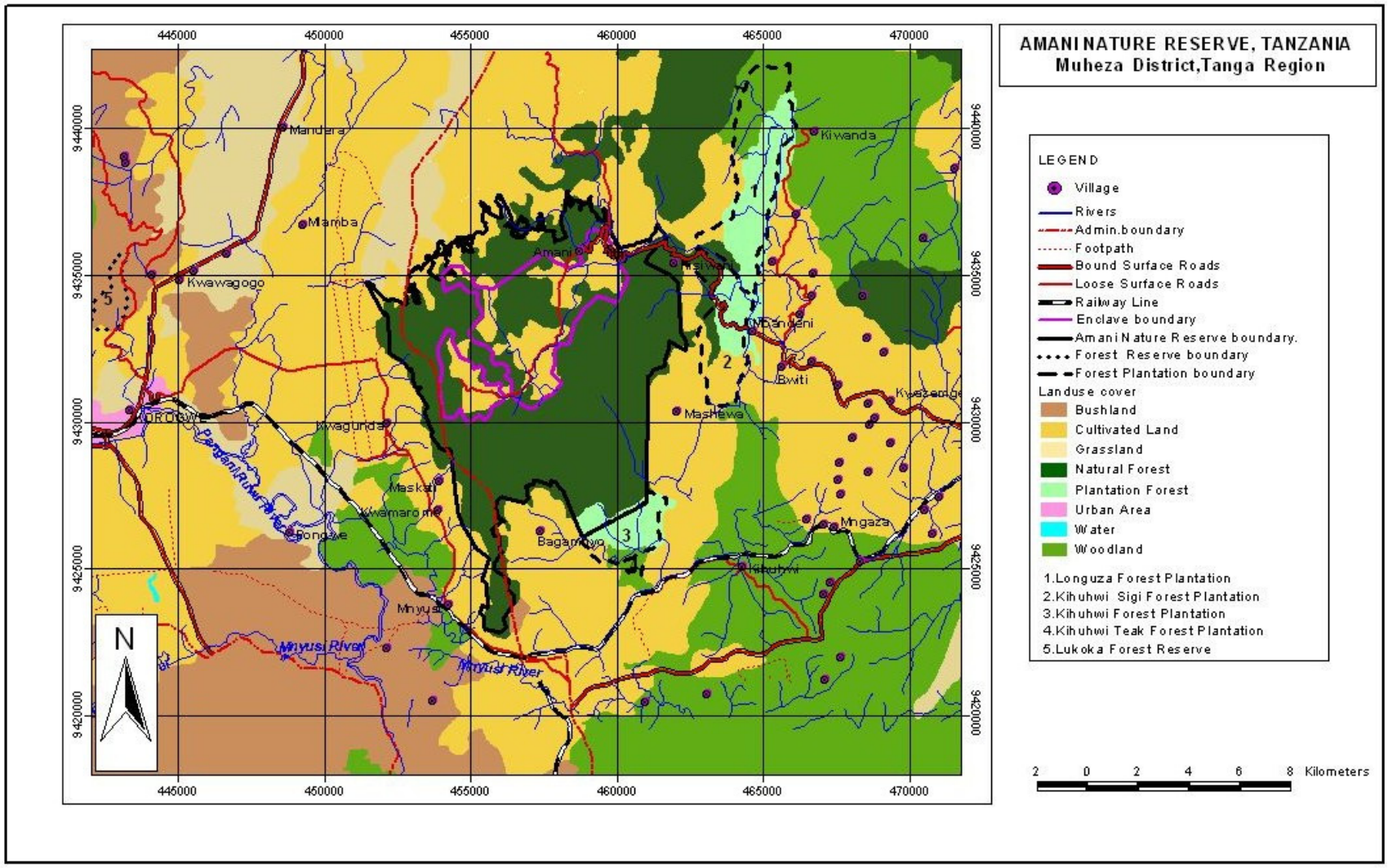
Period: 2008/2009 – 2012/2013

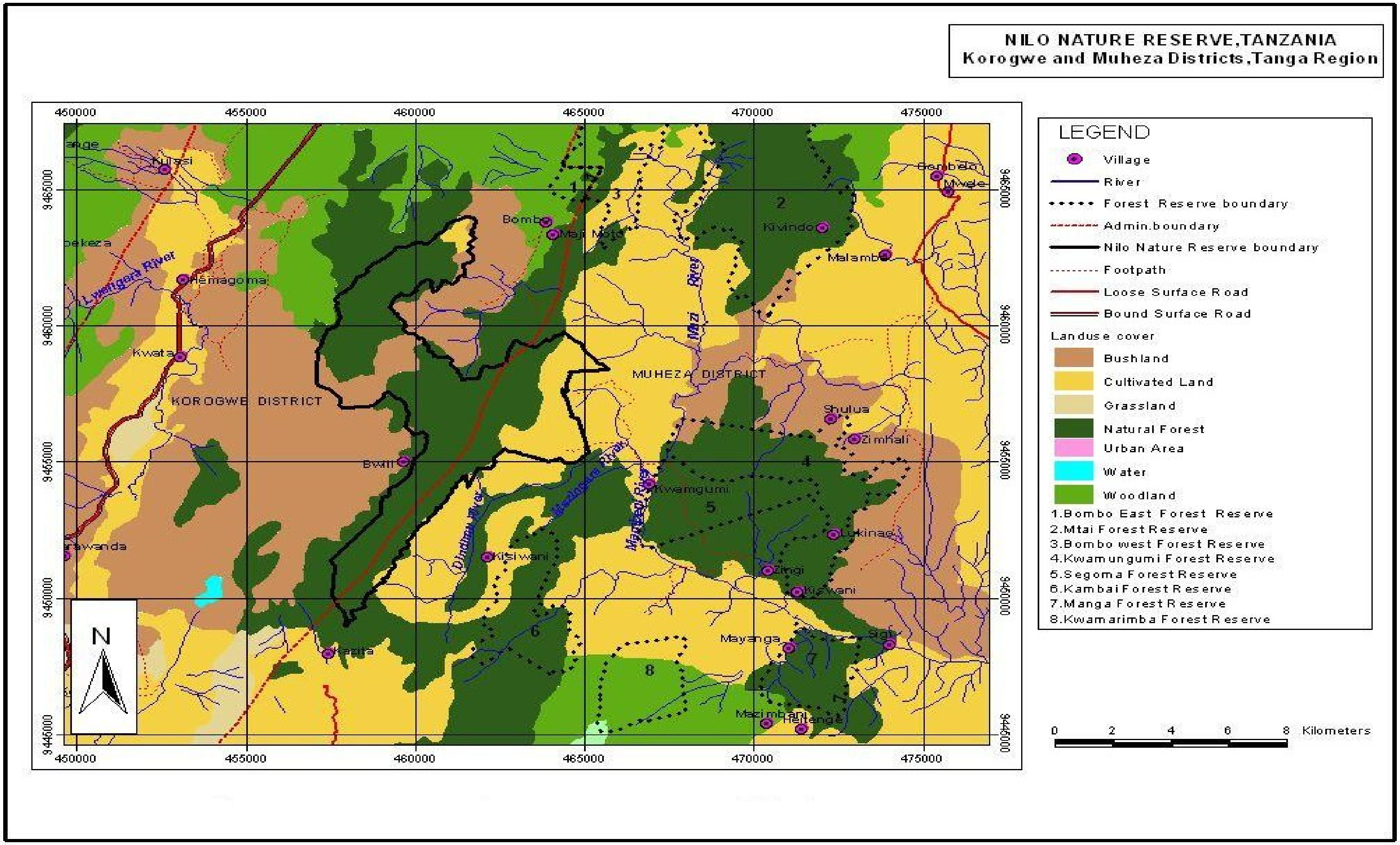
Status: Prepared June 2009 and approved 11 November 2009.

Staffing: The earlier complement of 11 staff was increased to 15 (1 Conservator, 1 Assistant Conservator, I Research/Training Officer, 2 Drivers and 10 Forest Assistants) following the recent approval of the management plan. A total of 45 staff is required (including 1 Conservator, 1 Assistant Conservator, 1 Research/Training Officer, 1 Tourism Officer, 4 Field officers, 4 Forest Assistants, 4 Forest Attendants, 4 Tour Guides and 17 support staff, as listed in the management plan).

Budget: T.Shs 6,216,775,512 for whole plan period, divided into T.Shs 1,434,012,025 as recurrent and T.Shs 4,782,763,487 as development budget. This budget is based on government and external funding.

Objectives: To preserve habitats, ecosystems and species in as undisturbed a state as possible.
To maintain genetic resources in a dynamic and evolutionary state.
To maintain established ecological processes.
To safeguard structural landscape features or rock exposures.
To secure examples of the natural environment for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded.
To minimise disturbance by careful planning and execution of research and other approved activities.
To limit public access.


AMANI NATURE RESERVE, TANZANIA
Muheza District,Tanga Region
LEGEND
Village
Rivers
Admin.boundary
Footpath
Bound Surface Roads
Loose Surface Roads
Railway Line
Enclave boundary
Amani Nature Reserve boundary.
Forest Reserve boundary
Forest Plantation boundary
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Plantation Forest
Urban Area
Water
Woodland
1.Longuza Forest Plantation
2.Kihuhwi Sigi Forest Plantation
3.Kihuhwi Forest Plantation
4.Kihuhwi Teak Forest Plantation
5.Lukoka Forest Reserve
N
2 0 2 4 6 8 Kilometers
445000
450000
455000
460000
465000
470000
9440000
9435000
9430000
9425000
9420000
Mandera
Kiwanda
Miamba
Kwawagogo
Amani
Msiwa
Mashewa
Kwaguruda
Maskati
Kwamarombo
Bongwe
Bagamoyo
Mnyusi
Kihuhwi
Mngaza
Bwiti
Miyusi River
Pangani River


NILO NATURE RESERVE,TANZANIA
Korogwe and Muheza Districts,Tanga Region
LEGEND
Village
River
Forest Reserve boundary
Admin.boundary
Nilo Nature Reserve boundary
Footpath
Loose Surface Road
Bound Surface Road
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Urban Area
Water
Woodland
1.Bombo East Forest Reserve
2.Mtai Forest Reserve
3.Bombo west Forest Reserve
4.Kwamungumi Forest Reserve
5.Segoma Forest Reserve
6.Kambai Forest Reserve
7.Manga Forest Reserve
8.Kwamarimba Forest Reserve
0 2 4 6 8 Kilometers
N
KOROGWE DISTRICT
MUHEZA DISTRICT
Kwata
Bombo
Maji Moto
Kivindo
Malambo
Shulua
Zimhali
Kwamgumi
Kisiwani
Mayanga
Sigi
Bwiti
Lukinao
450000
455000
460000
465000
470000
475000

ULUGURU MOUNTAIN BLOCK

The Uluguru Mountains are found within Morogoro Rural District (majority), Mvomero District and Morogoro Municipality – all within Morogoro Region. The main part of the Uluguru Mountains is a ridge running approximately north-south and rising to 2,630 m altitude at their highest point. The greater Ulugurus area also includes a number of isolated massifs surrounding the main block – Kitulangh'alo, Dindili, Mkumgwe, Mindu and Nguru ya Ndege. On the main Uluguru ridge, 50 villages touch the forest boundary of the Uluguru Nature Reserve and over 151,000 people are found within the mountain area, often at increasing densities at higher altitudes up to the forest boundary.

The vegetation of the Uluguru main ridge and the outlying blocks is extremely variable. It ranges from drier lowland miombo woodlands, to lowland coastal forests, transitional rainforests, and to sub-montane, montane and upper montane forest types. It also includes an area of afromontane grasslands on the Lukwangule plateau. All these habitats are rich in endemic species and are all of high conservation priority.

Biodiversity
In terms of endemic species the Uluguru Mountains possess at least 12 single block endemic vertebrates (five amphibians, three birds, one mammal and three reptiles). There are at least another three species of amphibians that await description. A further 39 Eastern Arc endemic vertebrates occur. For plants at least 78 vascular plants are found only on this mountain block. The forests of the main ridge are quite well known biologically, although each new survey continues to find additional species. The outlying blocks are poorly known, with some having almost no biological investigation.

Threats
The main challenges to the management of the Uluguru Mountains are fires that spread from farmlands and into the forest, intensive fire wood collection in higher, colder and more densely populated areas, deforestation of unprotected forests (in the north), and the presence of invasive species (*Rubus* in the south and *Maesopsis* in the north).

Core elements of the World Heritage property. Uluguru Nature Reserve (the former Uluguru South, Uluguru North, Bunduki Forest Reserves and some unprotected land). This covers 24,115.09 ha.

Buffer elements of the World Heritage property. No reserves abut the Uluguru Nature Reserve, which is surrounded by dense farmland. Some degraded forest areas are found to the north-east of the reserve, and these areas were forest until 2000. They have long been proposed as a Village Forest Reserve. There is also a tongue of forest extending from the north-western edge of the reserve down a river valley.

Other reserves in the Uluguru range. The following reserves are found in the Uluguru range: Kasanga, Mkangala, Mlaliwila, Ngambaula, Kimboza and Shikurufumi Forest Reserves. There is also forest in the reserves in five outlier mountain blocks (Mkungwe, Nguru ya Ndege, Dindili, Kitulang'halo, Mindu). In total these cover around 10,000 ha of miombo woodland and dry to wet forest habitat.

ULUGURU NATURE RESERVE

Name: Uluguru
Designation: Nature Reserve
Gazette notification: Government Notice No. 296
Date of notification: 7/11/2008
Land ownership: Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism
Area (ha): 24,115.09 ha

Location
Centre point: $6^0$51'-$7^0$01'S and $37^0$37'-$37^0$45'E
Districts: Mvomero and Morogoro districts, Morogoro Municipality
Mountain Block: Uluguru

Brief description
Geography: Uluguru Nature Reserve comprises the former Uluguru North, Uluguru South, Bunduki I and Bunduki II forest reserves and Bunduki corridor, where the forest is being restored to provide for biological connectivity between northern and southern parts of the Nature Reserve.
Settlements: A total of 57 villages, comprising 91,426 persons, surround the Nature Reserve. Most of these villages are located adjacent to its boundary.
Altitudinal range: 600 m (Bunduki Gap) – 2,638 m (Kimhandu)
Climate: The Uluguru Mountains are the wettest part of the Eastern Arc Mountains, receiving up to 4,000 mm rainfall per annum. Rainfall has been correlated with plant species richness.
Vegetation: Comprises sub montane (below 1,500 m), montane (1,600-2,400 m) and upper montane (above 2,400 m) forests, as well as grassland with swampy areas at Lukwangule Plateau, and Kimhandu and Lupanga peaks.
Species diversity: In general, species richness decreases with altitude but the number of endemic species is greater at higher altitudes. Lukwangule Plateau and Bondwa Hill, for example, have higher concentrations of endemic species than elsewhere. Biodiversity surveys have been undertaken by Frontier (2005).

Summary of biodiversity values:

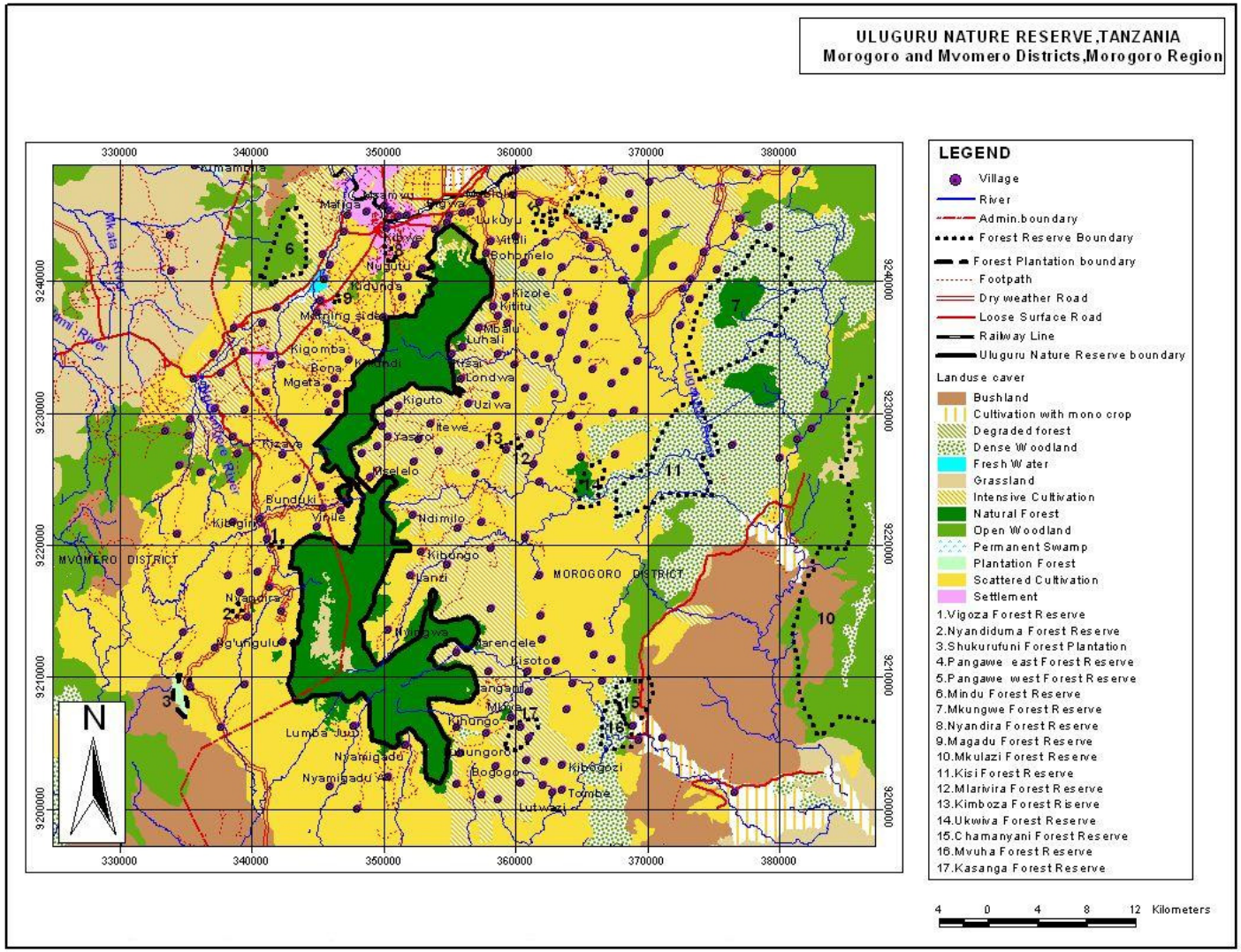
Taxonomic group	No. species.	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	not compiled	not compiled	*28	68	not compiled
Amphibians		12	15	3	2
Reptiles		11	4	2	1
Birds		7	7	3	2
Mammals		4	5	0	0
Vertebrates	not compiled	34	31	8	5

Management Plan
Period: 2009/10 – 2013/14
Status: prepared November 2009 and approved 16 October 2009.
Staffing: Currently 12 field and technical staff, plus 2 drivers), of which 6 are based in the Nature Reserve.
An additional 23 staff is required (2 Secretaries, 1 Personnel administration officer, 1 Store keeper, 1 Cashier, 1 Accountant, 2 Office attendants, 2 Tour guides, 4 Office security guards, 5 Beats in charges, 2 Ranger in charge, 1 Forest development officer, 1 New innovations officer).

Budget: USD 2,354,659 (T.Shs 3,061,057,000) over five years (2009/10-2010/14)

Goal "To protect the unique, biologically important rain forest ecosystem of the Uluguru Nature Reserve and to maintain biodiversity, genetic resources, natural processes and cultural values in an undisturbed, dynamic and evolutionary state in order to have ecologically representative example of the Eastern Arc forest ecosystem available for present and future generations as well as to enhance scientific study, environmental monitoring, environmental education, and sustainable controlled local and recreational use."

Objective: "To maintain biodiversity status, ecosystem services/functions, water catchment values (water quality and quantity) and improve livelihoods of the UNR's adjacent communities through poverty eradication mechanism."


ULUGURU NATURE RESERVE,TANZANIA
Morogoro and Mvomero Districts,Morogoro Region
LEGEND
Village
River
Admin.boundary
Forest Reserve Boundary
Forest Plantation boundary
Footpath
Dry weather Road
Loose Surface Road
Railway Line
Uluguru Nature Reserve boundary
Landuse caver
Bushland
Cultivation with mono crop
Degraded forest
Dense Woodland
Fresh Water
Grassland
Intensive Cultivation
Natural Forest
Open Woodland
Permanent Swamp
Plantation Forest
Scattered Cultivation
Settlement
1.Vigoza Forest Reserve
2.Nyandiduma Forest Reserve
3.Shukurufuni Forest Plantation
4.Pangawe east Forest Reserve
5.Pangawe west Forest Reserve
6.Mindu Forest Reserve
7.Mkungwe Forest Reserve
8.Nyandira Forest Reserve
9.Magadu Forest Reserve
10.Mkulazi Forest Reserve
11.Kisi Forest Reserve
12.Mlarivira Forest Reserve
13.Kimboza Forest Riserve
14.Ukwiwa Forest Reserve
15.Chamanyani Forest Reserve
16.Mvuha Forest Reserve
17.Kasanga Forest Reserve
MVOMERO DISTRICT
MOROGORO DISTRICT
N
4 0 4 8 12 Kilometers

NGURU MOUNTAIN BLOCK

The Nguru Mountains are located in Morogoro Rural District in Morogoro Region. There is the main Nguru block and a large isolated outlier at Kanga. These mountains range up to 2,400 m altitude in Nguru South. Villages from nine wards surround the reserves. The total population in the immediate vicinity of the Nguru mountain is over 61,250 people.

The forest vegetation is highly varied according to altitude. Lowland rain forest occurs between 300-900 m in valleys of the eastern slopes, between 300 and 900 m altitude. Submontane forest covers a large area between 900 and 1,400 m in the eastern valleys with fragments on the western slopes at 1400-1,500 m. Montane forest occurs between 1,400 and 1,800 m with moss covered upper montane forest at higher altitudes, and drier montane forests on the western side above Maskati mission at 1,600-2,000 m. Heath occurs on the upper ridges above 2,000 m, with some isolated stands as low as 1,200 m where soil conditions do not permit forest growth.

Biodiversity
In terms of biodiversity the Nguru Mountains have very high importance, much of this being discovered in the past 5 years. Current knowledge indicates that there are 14 single block endemics (13 amphibians and 1 reptile) and a further 44 Eastern Arc endemic vertebrate species. For vascular plants there are also 28 Eastern Arc endemic species. Some of these species are not yet described (amphibians).

Threats
The challenges to the conservation of the forests in the Nguru mountains come from agricultural encroachment and under planting of forest with cardamom and banana, pit sawing of timber and fires.

Core elements of the World Heritage property: Two Forest Reserves (Mkindu, Nguru South) are in the process of being merged into the Mkingu Nature Reserve (26,334 ha), which will form the core element of the World Heritage property in the area.

Buffer elements of the World Heritage property: There are a number of small reserves on the eastern flanks of the Nguru Mountains that take some pressure from the proposed nature reserve: Milonge, Diwale, Mgalonga, Mabunde-Mtwange Forest Reserves. These are managed by the local authority and cover less than 1,000 ha.

Other reserves in the Nguru Mountains. There are two other reserves in the Nguru range that contain montane to lowland forest habitats: Kanga and Magotwe, with a total area of 7,373 ha.

MKINGU PROPOSED NATURE RESERVE

Name of site: Mkingu
Designation: Forest Reserve
Proposed Nature Reserve
Gazette notification: Mkingu Forest Reserve comprises two former forest reserves, notified as follows:
- Nguru South Forest Reserve: GN No. None, JB 84 and JB 1069 of 1955; and
- Mkindo Forest Reserve: GN No. 409 of 3/12/1954. JB 212 and JB 2034 of 1980.

Gazettment of the Mkingu Nature Reserve, which comprises all of the demarcated area in survey plan JB No. 2620 (1: 50,000) of 2008, is underway. The boundary of the proposed Nature Reserve is in the process of being marked by concrete beacons (46% of 256 beacons are installed).
Date of notification: Mkingu Nature Reserve is in the process of being notified.
Land ownership: Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism
Area (ha): 23,387.88 ha

Location
Centre point: Between latitude 6°01' - 6°13' South and longitude 37°26' - 37°37' East
Districts: Mvomero
Mountain Block: Nguru

Brief description
Geography: The landscape is undulating, with sharp broken mountains and some very steep terrain. Peaks include Mkindo and Mndela.
Settlements: 23 villages, comprising a total population of 51,037 (2002 census), surround the proposed Nature Reserve, which is isolated from other forest fragments by settlements, Turiani town and commercial sugar cane and rice plantations. One of these villages, Ubiri (or Kombola), with 1,382 people, is an enclave within the Reserve.
Altitudinal range: 380 – 2,140 m (Maskati peak)
Climate: Estimated annual rainfall is 1,200 – 4,000mm. The dry season lasts from June to September but it is not marked on the eastern side, which experiences maximum rainfall. Maximum temperature ranges from 12°C to 24°C.
Vegetation: There are seven vegetation types: lowland rain forest, sub-montane forest, montane forest, upper montane forest, drier-montane forests, heath and miombo woodlands (Lovett and Pocs, 1993).
Species diversity: The Nguru Mountains is one of the wettest parts of the Eastern Arc Mountains, with which is attributed its higher number of number of endemic plant and animal species than many other mountain blocks.

Summary of biodiversity values:

Taxonomic group	No. species.	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	793	not compiled	not compiled	19	not compiled
Amphibians	38	11	15	10	0
Reptiles	43	14	5	1	0
Birds	214	4	3	0	0
Mammals	34	3	2	0	0
Vertebrates	329	32	25	11	0

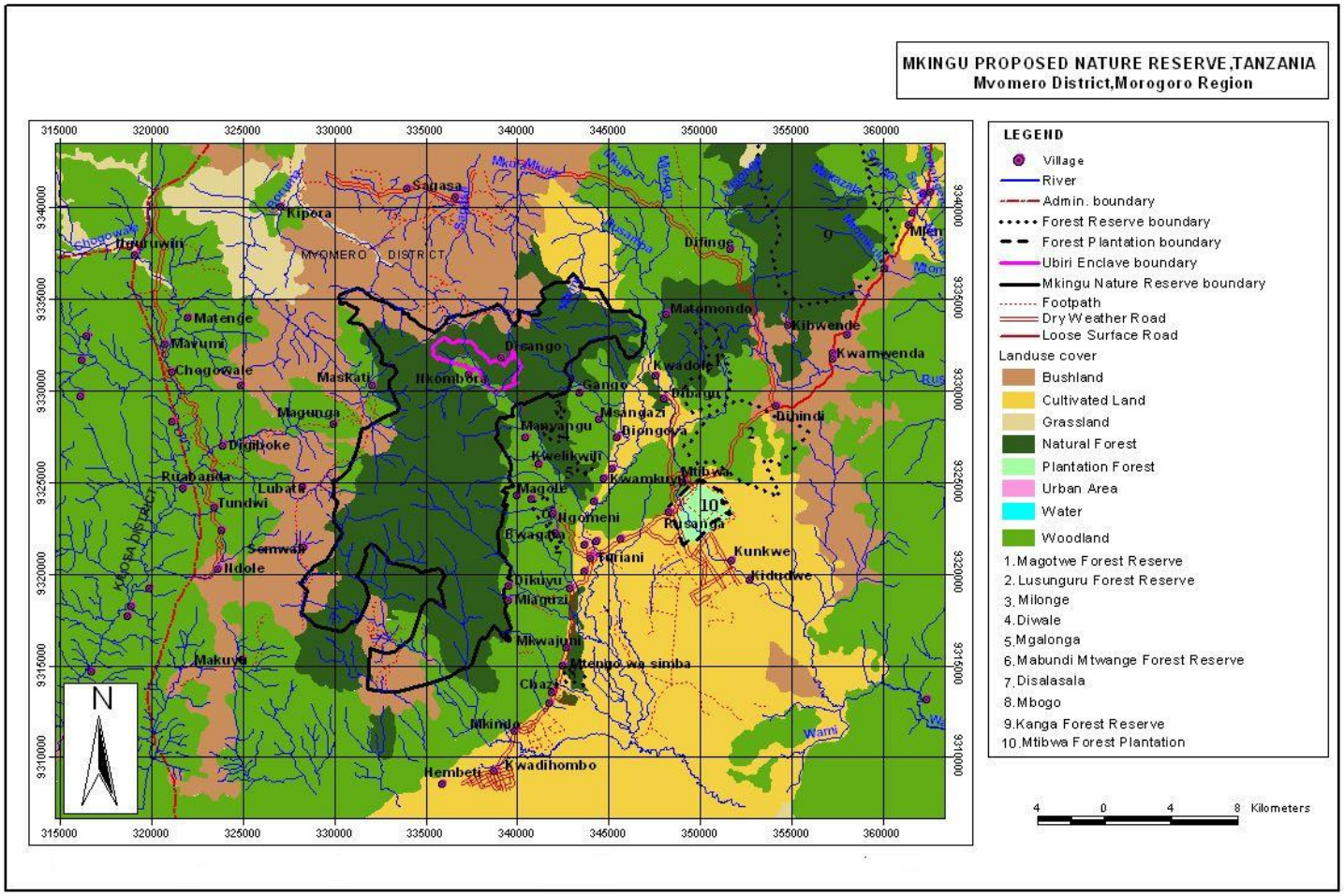
Management Plan
Period: 2009/10 - 2013/14
Status: Prepared September 2009 and approved on 16 October 2009.

Staffing: Currently 8 staff, of which 4 are forest attendants based in the field.
A total of 25 staff is proposed in the management plan, of which 4 will be responsible for forest ranges and 4 for beats.

Budget: T.Shs. 2,346,490,000 over 5 years (2009/10 - 2013/14)

Goal: "To protect the unique, biologically important rain forest ecosystem of the Nguru mountains and to maintain biodiversity, genetic resources, natural processes and cultural values in an undisturbed, dynamic and evolutionary state in order to have ecologically representative example of the Eastern Arc forest ecosystem available for present and future generations as well as to enhance scientific study, environmental monitoring, environmental education, and sustainable controlled local and recreational us*".*

Objectives: "To maintain biodiversity status, ecosystem services/functions, water catchment values (water quality and quantity) and improve livelihoods of Mkingu Nature Reserve's adjacent communities through poverty eradication mechanism."


MKINGU PROPOSED NATURE RESERVE,TANZANIA
Mvomero District,Morogoro Region
LEGEND
Village
River
Admin. boundary
Forest Reserve boundary
Forest Plantation boundary
Ubiri Enclave boundary
Mkingu Nature Reserve boundary
Footpath
Dry Weather Road
Loose Surface Road
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Plantation Forest
Urban Area
Water
Woodland
1.Magotwe Forest Reserve
2.Lusunguru Forest Reserve
3.Milonge
4.Diwale
5.Mgalonga
6.Mabundi Mtwange Forest Reserve
7.Disalasala
8.Mbogo
9.Kanga Forest Reserve
10.Mtibwa Forest Plantation
MVOMERO DISTRICT
KILOSA DISTRICT
Sagasa
Kipera
Itguruwin
Matenge
Mavumi
Chogowale
Maskati
Ilkombora
Magunga
Digimoke
Rubanda
Lubata
Tundwi
Semwali
Ildole
Makuyu
Disango
Sango
Matomondo
Kwadoli
Tchagu
Msangazi
Manyangu
Diongoya
Kwelikwiji
Kwamkuyu
Magole
Ngomeni
Kwagwa
Tuliani
Dikuyu
Magurzi
Mkwajuni
Mtengo wa simba
Chagu
Mkindo
Kwadihombo
Hembeti
Diffing
Kibwende
Kwamwenda
Dihindi
Mtibwa
Rusanga
Kunkwe
Kidudwe
Wami
N
4 0 4 8 Kilometers

UDZUNGWA MOUNTAIN BLOCK

This is the largest of the Eastern Arc blocks stretching across four Districts in central Tanzania. A small part is within Kilosa District and a strip of land is within Kilombero District (both Morogoro Region) and the rest is found in Kilolo and Mufindi Districts of Iringa Region. The Udzungwa Mountains rise to 2,750 m altitude and there is a large plateau area above 1,500 m altitude. There are at least 146 villages in the Udzungwa mountains, containing at least 698,295 people. Some areas have high population density, but there are also large areas with sparse population and few villages, particularly in the higher areas on the north-western margins of the Udzungwa Mountains National Park and the Kilombero Nature Reserve.

The vegetation of the Udzungwa Mountains is exceptionally variable, ranging from lowland forests, through sub-montane, montane and to upper montane forests. There are also extensive areas of montane grassland of various types, montane wetland areas, and heath lands. At lower altitudes the vegetation grades into various forms of woodlands.

Biodiversity
In terms of endemic species the Udzungwa Mountains support 19 strict endemic vertebrate species (seven amphibians, two birds, three mammals and seven reptiles) and a further 44 Eastern Arc endemic vertebrate species. There are also 65 vascular plants endemic to the Udzungwa block. Some of the forests are relevantly well explored biologically, but a number of other forest areas are still largely unexplored. This includes the large forest block on the Luhomero massif and many of the smaller forest reserves. The National Park is also not completely surveyed. As new species of mammals and other animals continue to be discovered in the Udzungwas it can be assumed that we do not yet have full knowledge of the species that are found there.

Threats
Management of the Udzungwa forests faces a number of challenges, foremost being extensive wild fires in the grassland areas that sometimes enter and destroy areas of forest. Other threats include farmland encroachment into some forests, logging where protection efforts are weak, and the collection of animals for the pet trade.

Core elements of the World Heritage property. Core areas are Udzungwa Mountains National Park (199,000 ha), Kilombero Nature Reserve (134,511 ha) and the proposed Uzungwa Scarp Nature Reserve (32,763 ha).

Buffer elements of World Heritage property. Udzungwa Mountains National Park is buffered to the north and west by the Kilombero Nature Reserve. In the same way, Kilombero Nature Reserve is buffered to the south and east by the Udzungwa Mountains National Park. Together these two reserves from a contiguous management unit covering over 330,000 ha of forest and grassland. The Uzungwa Scarp proposed Nature Reserve is not buffered by any abutting forests; however, there is a potential corridor of land at Mngeta that could join Uzungwa Scarp to Kilombero Nature Reserve. If this corridor is gazetted, then the effective conservation unit within the Udzungwa Mountains would enlarge still further.

Other reserves in the Udzungwa Mountains. These include Iwonde, Iyondo, Nyanganje, Ihanga, Kibao, Mufindi Scarp East, Mufindi Scarp West, Kigogo, Njerera (Luhega), Ihang'ana, Idewa, Kidete, Mlali, Image, Kilanzi Kitungulu, Kisinga-Lugalo, New Dabaga, Ulagambi, W. Kilombero Scarp, Udzungwa scarp, Kitemele, Kawemba, Kitonga, Kimala, Lugoda Lutali, Myangala, Ndynduli, Duma, Kidegemsitu, Lufuna, Ipafu, Igoda, Mkonge, Kitwile, Mpanga, Luhunga, Madisi, Lulanda, Ukami, Mufindi Tea, Kyfulilo Farm, Malenda Farm, Brook Bond). In total these cover at least 70,000 ha.

KILOMBERO NATURE RESERVE

Name of site:	Kilombero
Designation:	Nature Reserve
Gazette notification:	The Nature Reserve was formed by amalgamating three former forest reserves (Matundu, Iyondo and West Kilombero Scarp), now revoked, within the Udzungwa Mountains (Government Notice No. 182). Boundaries are delineated on Map No. JB 2525.
Date of notification:	17/08/2007
Land ownership:	Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism
Area (ha):	134,511 ha

Location

Centre point:	$36^0$17'45"E and 7^0 55'00"S
Districts:	Kilombero and Kilolo
Mountain Block:	Udzungwa

Brief description

Geography: The Nature Reserve occupies the middle portion of the Udzungwa Mountains, lying between Udzungwa Mountains National Park and Udzungwa Scarp Forest Reserve. It comprises a highly undulating chain of mountains that descend to the lowlands and meet the wetlands of Kilombero Valley. Rocks are pre-Cambrian in origin, comprising granitised basement and metamorphic types with granite, gneiss, schist and quartzite.

Settlements: 18 villages surround the Nature Reserve, having a total population of 53,346 whose main source of livelihood is subsistence farming. This is supplement by fishing in Kilombero's rivers, which generates substantial income for villagers.

Altitudinal range: 1,040 – 2,600 m (Nyumbanitu Peak)

Climate: Annual rainfall is estimated to be 1,500-2,000 mm in the mountainous areas and 1,350 mm in the lowlands. The rainy season is between November and April; the cool season, with high day temperatures and cool nights, lasts from May to August; and the dry season occurs between June and November. Mean annual temperature reaches 20^0c maximum in December and 15^0C minimum in July in the mountains; and 27^0C maximum in December and 19^0C minimum in July in the lowlands.

Vegetation: In upland areas, the vegetation comprises moist and dry montane, upper montane forest with some patches of bamboo and upland grassland. In the drier, lower-lying areas, there is lowland forest, some of which has been replaced by woodland and grassland. Characteristic species of each forest type are as follows:

- Montane Forest: Typical trees include *Cassipourea gummifla, Maesa lanceolata*, *Neoboutonia macrocalyx, Podocarpus* sp, *Aphloia* sp. and *Cola* sp.
- Upper Montane Forest: Typical trees include *Aphloia theiformis*, *Bersama abyssinica, Syzygium guineense, Ocotea usambarensis*, *Hagenia abyssinica* and *Tecomaria* sp.
- Riverine Forest: within woodland/grassland is usually dominated by *Syzygium cordatum* with varying amounts of *Bridelia micrantha*, *Faurea* sp, *Khaya anthotheca, Milicia excelsa* and *Rauvolia caffra*.
- Woodland: in higher altitudes is dominated by *Protea sp*, while in lower altitudes it is dominated by *Brachyestegia* sp. and *Albizia gummifera.*
- Lowland Forest: Typical trees include *Khaya anthotheca,* and *Milicia excelsa*

A *Cassipoure/Cola/Craterispermum* community is the dominant forest type at most altitudes in the former West Kilombero Scarp Forest Reserve. Additionally a *Hagenia/Tecomaria* community dominates high altitudes (>2,000 m) and at mid altitudes (1,850-2,000 m) a *Neoboutonia/Aphloia/Podocarpus* community is common (Frontier Tanzania 2001).

Species diversity: The flora and fauna of the former West Kilombero Scarp Forest Reserve has been surveyed by Frontier Tanzania (Frontier Tanzania 2001). A total of 141 species of trees (above 10 cm dbh), representing 44 families and 106 genera, were identified from vegetation plots and a further 258 species were recorded opportunistically.

Summary of biodiversity values:

Taxonomic group	No. species*	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	399	not compiled	not compiled	1	not compiled
Butterflies	102				
Millipedes	38				
Molluscs	54				
Invertebrates	**194**	**not compiled**	**not compiled**	**not compiled**	**not compiled**
Amphibians	20	4	9	0	0
Reptiles	19	3	2	0	0
Birds	151	5	9	0	0
Mammals	54	6	9	1	1
Vertebrates	**244**	**18**	**29**	**1**	**1**

*Source of faunal diversity data: Frontier Tanzania (2001)

Management Plan

Period: 2009/10 – 2013/14

Status: Prepared September 2009 and approved on 11 September 2009.

Staffing: Currently 18 staff; a total complement of 98 staff is planned for 2010-2011.

Budget: Implementation of this management plan will cost T.Shs 12.,715,839,000, of which T.Shs 9,806,176,000 is for development.

Goal: The Nature Reserve will be managed mainly for wilderness protection in line with IUCN Protected Areas Category 1b for wilderness areas.

Objectives: The main management objective is to maintain biodiversity, ecological processes, cultural and environmental values in an undisturbed, dynamic and evolutionary ecosystem for present and future generations.

Conservation and environmental objectives are:

a) To maintain genetic resources in a dynamic and evolutionary state;
b) To improve and maintain ecological processes;
c) To safeguard unique sites (cultural and scenic views) ;
d) To preserve natural habitat and biological diversity;
e) To promote research and scientific studies, including environmental monitoring and evaluation;
f) To improve management of Kilombero Nature Reserve; and
g) To improve returns for the efficient management of the Nature Reserve.

Social economic objectives are:

a) To promote sustainable production of wood and other forest products in buffer zone areas for provision of wood materials (fuel wood, poles and construction timber) and income.
b) To ensure regulated extraction of fodder, medicines, fruits, honey, wild vegetables etc. for individuals, households and the community in general.
c) To intensify collaborative extension services between forestry and other sectors, dealing with land use and environmental protection to enhance integrated rural development.
d) To promote alternative Income Generating Activities among communities.

UDZUNGWA MOUNTAINS NATIONAL PARK

Name of site: Udzungwa Mountains
Designation: National Park
Gazette notification: The National Park was established from the existing forest reserves of Mwanihana, Nyanganje, Iwonde and parts of Matundu and West Kilombero Scarp in accordance with the National Parks Ordinance (Cap 412)
Date of notification: 20 March 1992 (Government Notice No. 39)
Land ownership: Tanzania National Parks
Area (ha): 199,000 ha

Location

Centre point: 3⁰41'E and 7⁰48'S
Districts: 80% of the National Park lies in Kilolo District and 20% in Kilombero District.
Mountain Block: Udzungwa

Brief description

Geography: The National Park is dominated by Mwanihana and Luhemero Peaks and the escarpments that form its western boundary, and the Ruaha River in the north. The area, together with the adjacent Kilombero Nature Reserve, serves as a major water catchment for the region. The Ruaha supplies the hydroelectric dam at Kidatu and that at Kihansi also depends heavily on the park's rivers.

Settlements: There are 31 villages, 26 in the east and 5 in the west. The population in the east is estimated to be 130,086, based on a 2002 census, and that in the west is 9,262.

Altitudinal range: 200 m to 2,580 m (Luhemero Peak)

Climate: Most of the annual rainfall is received from November to May, which comprises the short rains of October – December and the longer rains of March - May. The dry season is from September to October. There is a pronounced rain shadow effect, with an annual rainfall of about 2,000 mm in the south-east of the park, which is often covered by mist, and about 600 mm in the north-west. The latter is responsible for the dry deciduous woodland dominated by *Commiphora* spp. and *Acacia* sp. Temperature reaches a maximum in October (31⁰C) and minimum in July (21⁰C).

Vegetation: Udzungwa Mountains National Park has distinctive natural vegetation zones, which range from lowland forest below 200 m to alpine grassland at 2,500 m. Within the unique tropical forest are the lower montane forest, upper montane forest, and bamboo forest. Standing out conspicuously from the escarpment forest are tall yellowish-white trunked trees (*Sterculia appendiculata*), with an umbrella of green foliage at the top.

Species diversity: The Udzungwa Mountains National Park contains the greatest altitudinal span of habitats of any of the sites in the Eastern Arc Mountains. As such it is likely to support the highest species diversity of all the sites, but detailed comparative data are not available.

Summary of biodiversity values:

Taxonomic group	No. species*	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	not compiled	not compiled	not compiled	17	not compiled
Amphibians	not compiled	5	9	0	0
Reptiles	not compiled	6	3	3	0
Birds	> 250	6	9	0	0
Mammals	not compiled	4	8	0	0
Vertebrates	not compiled	**21**	**29**	**3**	**0**

Management Plan (TANAPA 2001)

Period: The General Management Plan provides a package of 18 priorities for funding by Tanzanian National Parks and donors over a 10-year period.

Status: Published in September 2001 (approved). The Plan is currently being revised.

Staffing: Currently about 78 permanent staff.

Budget:: T.Shs 665 million recurrent and T.Shs 119 million capital/development expenditure in 2008/09; T.Shs 800 million recurrent and T.Shs 190 capital expenditure (comprising T.Shs 100 million for Support for Community Initiated Projects and T.Shs 90 million from donors) in 2009/10.

Goal: The National Park was created specifically to safeguard the mountains' water catchment and biological values. The long-term goal is to conserve biodiversity and ecological functions for their socio-economic importance.

Objectives: The purposes of the National Park are:

- To protect a representative sample of the Eastern Arc Mountains and conserve the unique ecological ranges and features of the mountain system.
- To protect the natural forests as a watershed, providing high quality water to Kidatu Hydroelectric Dam and to surrounding agricultural land and local communities.
- To protect the area against soil erosion on steep mountain slopes.
- To conserve an area of exceptional natural and scenic beauty,
- To protect the forests as a storehouse of genetic diversity.
- To protect the habitat of threatened endemic and rare species.

The Plan includes a range of specific objectives concerning the management of natural, cultural and historic resources, visitors and socio-economic development.

The collection of firewood and no-timber forest products from the National Park by local communities is being phased out gradually through the promotion of alternative source of energy and income-generating activities. Collection of medicinal plants and grass for thatching has been banned since 2006; and fire wood collection is due to be banned in mid-2011 due to their adverse effects on the park resources. Visitor numbers are steadily increasing and reached 4,734 in 2009.

UZUNGWA SCARP PROPOSED NATURE RESERVE

Name of Site: Uzungwa Scarp

Designation: Forest Reserve
Proposed Nature Reserve

Gazette notification: Uzungwa Scarp was notified a Forest Reserve in Gazette Notice 198. Boundaries are delineated on Map JB 24 - 2740 (1:100,000) 1931; JB 68 (1:100,000) 1952 covers the eastern boundary. The boundary of the proposed Nature Reserve has been re-mapped in 2009 (JB 2564)

Date of notification: 1929

Land Ownership: Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism.

Area: 32,763.2 ha

Location:

Centre point: Between latitude 8°14' - 8°32' S and longitude 35°51' - 36°02' E

Districts: Kilombero and Kilolo

Mountain block: Udzungwa

Brief description

Geography: Uzungwa Scarp covers the steep east-facing Udzungwa escarpment and part of the undulating upland plateau. The southern boundary is the Chita River, the northern boundary the Kidete River and the western boundary the Ruaha, Iwolo and Lukosi rivers.

Settlements: Eight villages surround the reserve (Idegenda, Masisiwe, Mbawi, Ihimbi, Uhafiwa, Ukami, Kihansi, Ikule, Chita). Population figures for 2008: Chita 13,360; Ikule 1735.

Altitudinal range: 300 – 2,068 m

Climate: Annual rainfall in the area ranges from 1,350 mm to 2,000 mm and sometimes exceeds 3000 mm in wetter areas. Estimated mean temperatures range between 20°C maximum in December and 15°C minimum in July. On lowland areas temperatures reach a maximum in December (27°C) and minimum in December (19°C).

Vegetation: Comprises lowland, submontane and montane forests, with areas of seasonally inundated mbuga grassland and grassland with bushes. Lowland forests are relatively dry and have a low, often broken canopy with woodland species except near streams. Submontane forests are well developed, though they have dry forest species on the ridges. Much of the montane forest on the plateau above the scarp is secondary, and may have been cultivated in the historical past. Extensive stands of bamboo are reported from the western side. Interpretation of aerial photographs of the vegetation cover taken in 1957 by HIMA/DANIDA in 1990 provides figures of 238 ha of Mbuga grassland, 1113 ha of bushed grassland, 18,463 ha of closed moist forest and 921 ha of open moist forest (Lovett and Pócs 1993).

Lowland forest: Canopy 10 - 15 m, taller along streams, with emergents to 20 - 30 m. Much disturbed in the lower parts with tangled thicket following extraction of *Milicia excelsa*. Trees include: *Afzelia*, *Anthocleista*, *Funtumia*, *Garcinia buchananii*, *Khaya nyasica*, *Malacantha*, *Milicia*, *Newtonia*, *Porterandia*, *Sorindeia*, *Terculia*. Woodland species occurring in the forest include: *Annona*, *Kigelia africana*, *Sterculia quinqueloba*.

Submontane forest: Canopy 20 - 30 m in the valleys, lower on the ridge tops. Trees include: *Allanblackia stuhlmannii*, *Bequaertiodendron natalense*, *Bombax*, *Ixora scheffleri*, *Newtonia buchananii*, *Octoknema*, *Syzygium guineense* subsp. *afromontanum*.

Montane forest: Canopy 15 - 20 (25) m. The forest is apparently in an early successional stage, with many small poles and large moribund *Agauria salicifolia*. Trees include: *Agauria salicifolia, Aningeria adolfii-freidericii, Aphloia, Bersama abyssininca, Cassipourea malosana, Drypetes gerrardii, Ensete, ventricosa Macaranga kilimandscharica, Measa lanceolata, Parinari excelsa, Phoenix reclinata, Pittosporum viridiflorum, Rapanea melanophloeos, Schrebera alata, Tabernaemontana, Trichoscypha ulugurensis*, and *Xymalos monospora*.

Summary of biodiversity values:

Taxonomic group	No. species*	No. endemic species	No. threatened endemic/ near-endemic species	OUV - Site endemic species	
				No. endemic spp.	No. threatened endemic species
Flora	not compiled	not compiled	not compiled	6	not compiled
Amphibians	36	12	19	5	5
Reptiles	33	14	5	0	0
Birds	18	4	7	0	0
Mammals	10	5	6	0	0
Vertebrates		**35**	**37**	**5**	**5**

Management plan

Period 2010/2011 – 2015/2016

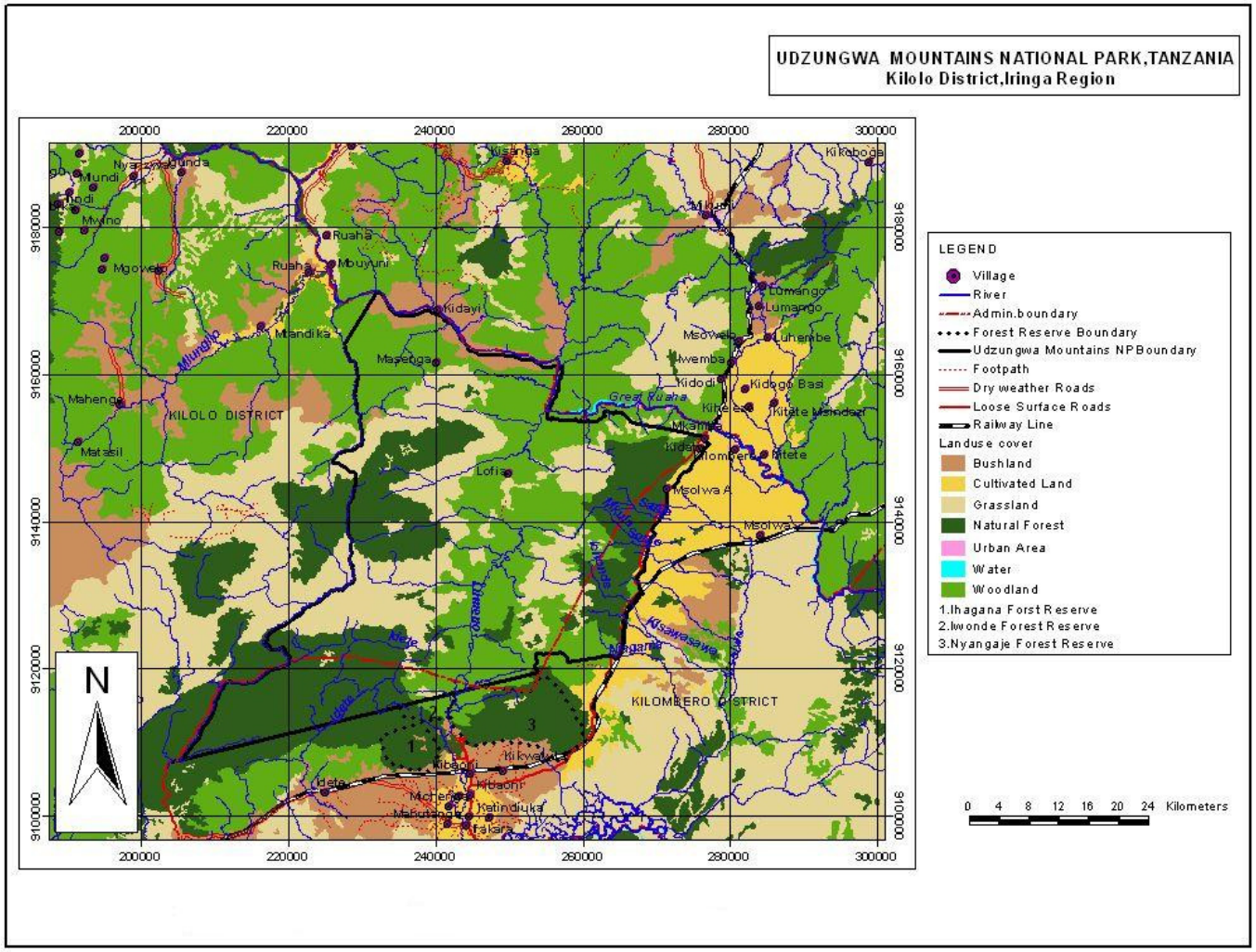
Status: The management plan is being prepared and the Forestry and Beekeeping Division is committed to complete this work by the end of 2010, using the standard format and procedures for the preparation of nature reserve management plans as applied for the other nature reserves included in this nomination. The overall goal and objectives for the reserve will remain consistent with those for other nature reserves as will the management approach. Considerable progress has been made with mapping the reserve boundaries and demarcating them with permanent beacons and directional trenches. All villages surrounding the reserve have signed agreements supporting the gazettment of the nature reserve as have the two districts (Kilombero and Kilolo).

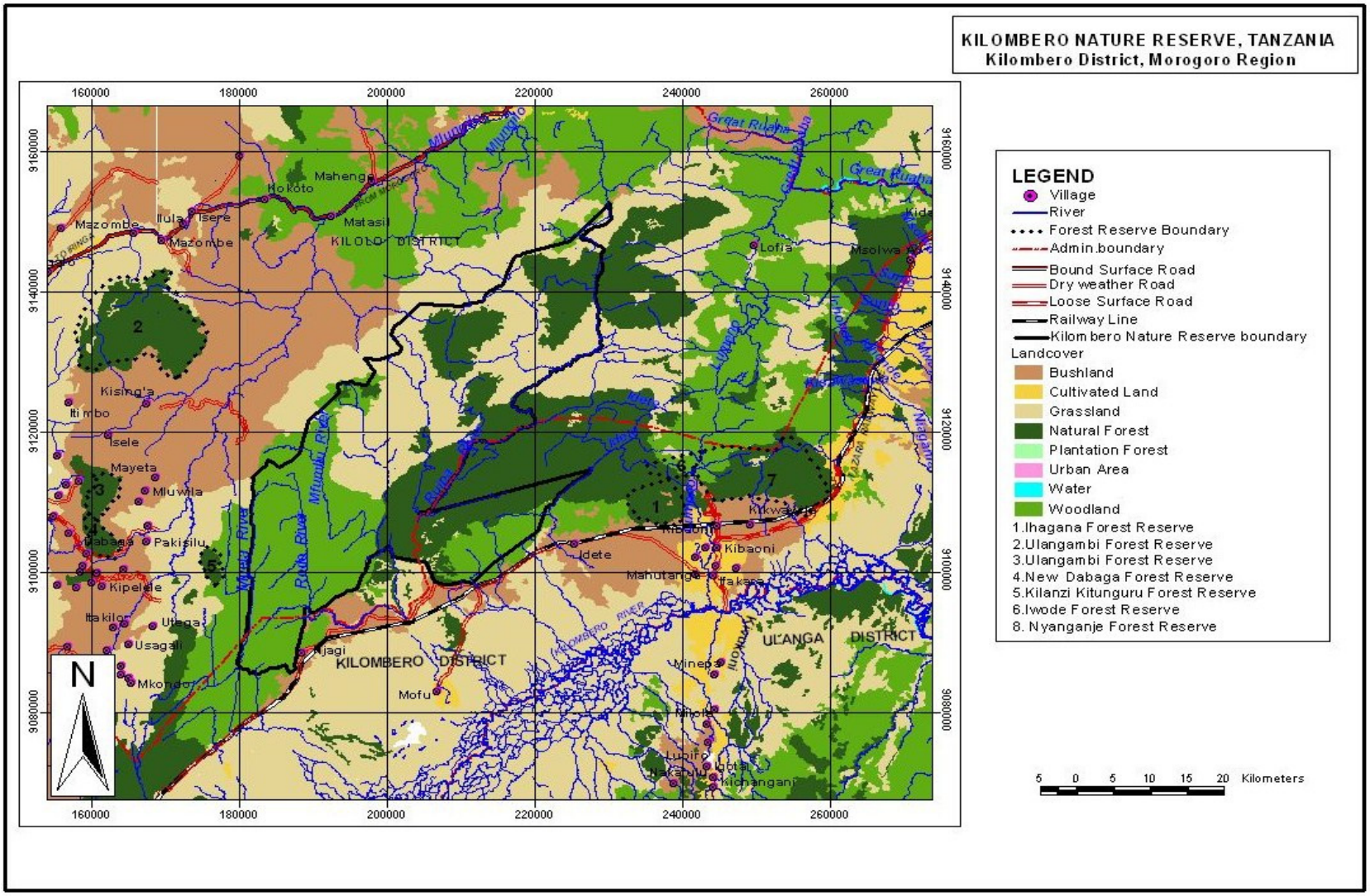
Staffing: Currently 1 Forest Officer. This will increase significantly once the Nature Reserve is established.

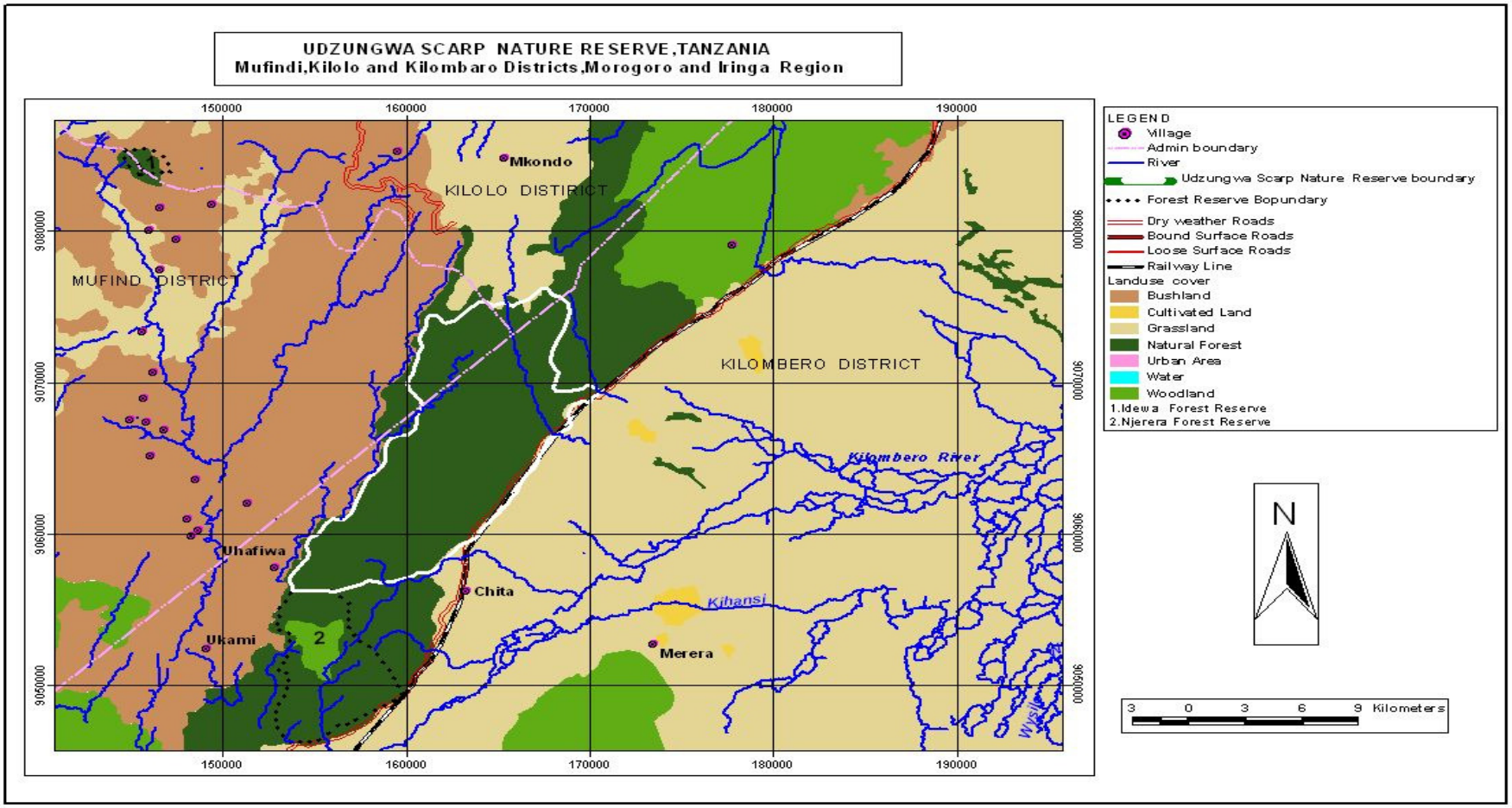
Budget: Recurrent T.Shs 1.5 million / year and development T.Shs 18,000,000 (2008 / 09). It is anticipated that this will increase once the reserve is gazetted as a Nature Reserve.

Goal In line with the goal of other nature reserves, Uzungwa Scarp Nature Reserve will protect the unique, biologically important rainforest ecosystem of the Udzungwa Mountains and maintain biodiversity, genetic resources, natural processes and cultural values in an undisturbed, dynamic and evolutionary state for the benefit of present and future generations, as well as to enhance scientific study, environmental monitoring, environmental education, and sustainable controlled local and recreational uses.

Objectives: To preserve habitats, ecosystems and species in as undisturbed a state as possible.
To maintain genetic resources in a dynamic and evolutionary state.
To maintain established ecological processes.
To safeguard structural landscape features or rock exposures.
To secure examples of the natural environment for scientific studies, environmental monitoring and education, including baseline areas from which all avoidable access is excluded.
To minimise disturbance by careful planning and execution for research and other approved activities.
To limit public access as appropriate to meet biodiversity conservation objectives.


UDZUNGWA MOUNTAINS NATIONAL PARK,TANZANIA
Kilolo District,Iringa Region
LEGEND
Village
River
Admin.boundary
Forest Reserve Boundary
Udzungwa Mountains NP Boundary
Footpath
Dry weather Roads
Loose Surface Roads
Railway Line
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Urban Area
Water
Woodland
1.Ihagana Forst Reserve
2.Iwonde Forest Reserve
3.Nyangaje Forest Reserve
N
0 4 8 12 16 20 24 Kilometers
KILOLO DISTRICT
KILOMBERO DISTRICT
200000
220000
240000
260000
280000
300000
9180000
9160000
9140000
9120000
9100000


KILOMBERO NATURE RESERVE, TANZANIA
Kilombero District, Morogoro Region
LEGEND
Village
River
Forest Reserve Boundary
Admin.boundary
Bound Surface Road
Dry weather Road
Loose Surface Road
Railway Line
Kilombero Nature Reserve boundary
Landcover
Bushland
Cultivated Land
Grassland
Natural Forest
Plantation Forest
Urban Area
Water
Woodland
1.Ihagana Forest Reserve
2.Ulangambi Forest Reserve
3.Ulangambi Forest Reserve
4.New Dabaga Forest Reserve
5.Kilanzi Kitunguru Forest Reserve
6.Iwode Forest Reserve
8. Nyanganje Forest Reserve
N
KILOMBERO DISTRICT
ULANGA DISTRICT
Kilombero River
Great Ruaha
Mahenge
Hokoto
Matasil
Mazombe
Ilula
Isere
Lofia
Msolwa
Kisinga
Itimbo
Isele
Mayeta
Mluwila
Dabaga
Pakisilu
Kipelele
Itakilo
Utaga
Usagali
Ijagi
Mkongoro
Mofu
Idete
Kibaoni
Mahutanga
Ifakara
Mineps
Nyoka
Lupiro
Kichangani
Kilometers


UDZUNGWA SCARP NATURE RESERVE,TANZANIA
Mufindi,Kilolo and Kilombaro Districts,Morogoro and Iringa Region
150000
160000
170000
180000
190000
9080000
9070000
9060000
9050000
Mkondo
KILOLO DISTRICT
MUFIND DISTRICT
KILOMBERO DISTRICT
Kilombero River
Uhafiwa
Chita
Kihansi
Ukami
Merera
1
2
LEGEND
Village
Admin boundary
River
Udzungwa Scarp Nature Reserve boundary
Forest Reserve Bopundary
Dry weather Roads
Bound Surface Roads
Loose Surface Roads
Railway Line
Landuse cover
Bushland
Cultivated Land
Grassland
Natural Forest
Urban Area
Water
Woodland
1.Idewa Forest Reserve
2.Njerera Forest Reserve
N
3 0 3 6 9 Kilometers

2.b History and Development

The Eastern Arc World Heritage Site is built from a network of reserves that have been declared over the past 100 years. These reserves were originally gazetted with the aim of protecting the upper catchment areas of the Eastern Arc, to ensure water supply and prevent soil erosion, but also to provide a source of valuable timber. The reserve network was initiated by the German colonial government, and the process to gazette the remaining areas of forest was continued by the British colonial and independent Tanzanian governments. Some areas of lowland forest have also been gazetted, but most of this forest had already been cleared 100 years ago, and is often managed for timber production rather than protection.

Today, more than 150 reserves exist on the Eastern Arc Mountains and are variously managed for nature conservation (National Parks and Nature Reserves), catchment protection (national Forest Reserves) and production (production Forest Reserves). One trend in recent years has been to impose stricter protection of forests in Tanzania, and to upgrade the most important reserves into higher levels of protection. For example, in 1985 a logging ban imposed across all the national Forest Reserves within the Eastern Arc Mountains, and the emphasis of management was shifted more towards catchment and biodiversity protection. Prior to that logging was being undertaken on a commercial basis within a number of the more accessible reserves across the Arc, with the logs being used for local consumption and for export. The emphasis on preventing logging was supported by donor funding, primarily from the Scandinavian countries.

In the 1990s a number of forest reserves were upgraded to higher levels of protection and greater emphasis on biodiversity protection. In 1992 the Udzungwa Mountains National Park was created from the Mwanihana Forest Reserve, and parts of the Matundu and West Kilombero Scarp forest reserves. This was the first National Park in Tanzania that was specifically established for the conservation of endemic species and not for large mammals and / or scenic values. In 1999 the Amani Nature Reserve was established in the East Usambara Mountains from the amalgamation of a number of smaller forest reserves, and some unprotected forest land.

This trend has continued into the 2000s. As a part of a larger project to develop a holistic conservation strategy for the entire Eastern Arc Mountains region (see www.easternarc.or.tz), the Forestry and Beekeeping Division developed a plan for further Nature Reserves in 2005, and this proposed the creation of 6 new nature reserves across the Eastern Arc to capture the sites of highest biodiversity importance. At the same time this Division reviewed the management of its reserves against the concept of a protected area and various different categories defined and promoted by IUCN. This led to the proposal of protected area categories for 87 Forest Reserves covering 656,815 ha across the Arc, which has subsequently been accepted by IUCN World Commission on Protected Areas and registered in the UNEP-WCMC World Databases of Protected Areas. An additional new Nature Reserve, Magamba in the West Usambara, was added to the list of proposed Nature Reserves in 2008. By January 2010 Forestry and Beekeeping had gazetted four of the proposed eight Nature Reserves across the Arc, and work is proceeding to gazette the remaining four. In addition, management plans have been developed and accepted for six of the Nature Reserves, with one awaiting approval and another under preparation. Meanwhile, the management plan for Udzungwa Mountains National Park is being revised this year.

As the same time as upgrading the protection status of the forests in the Eastern Arc, there has also been a strong effort to increase the participation of local people in the management of these forest areas. This has involved the development of 'co-management' approaches in government reserves (termed Joint Forest Management), including within Nature Reserves. It has also included the establishment of Village Land Forest Reserves (Village Forest Reserves and Community Forest Reserves under Community-Based Forest Management).

Despite the emphasis on co-management and community management approaches, there are limited legitimate benefits from the forests available to local people. Logging is banned in all protected forests across the Eastern Arc Mountains and access to non-timber forest products has become more restricted. Given the pressures on local livelihoods, there is much illegal exploitation of timber, poles, firewood and minor forest products such as bushmeat. Thus, co-management needs to develop more opportunities for communities to benefit from the forests.

3. Justification for Inscription

3.a Criteria under which inscription is proposed (and justification for inscription under these criteria)

Criteria (ix) be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals

The Eastern Arc Mountains are important biological refugia, with numerous endemic taxa representing ancient lineages that have survived millions of years of climatic fluctuations elsewhere on the African continent, as well as being centres of more recent speciation and radiation. For example, almost all of the world's African violet (*Saintpaulia*) species are restricted to the forests on these mountains.

The 9 sites comprising this serial nomination are globally important as a record of evolution of life on earth, especially for ancient groups of birds, mammals, reptiles and amphibians having 30 million year old and older radiations. This has been clearly shown by ongoing DNA analysis at the universities of Copenhagen in Denmark, and Stellenbosh in South Africa. Such evidence is based on there being at least 40 genera of plants and at least 6 genera of vertebrates that are endemic to the Eastern Arc Mountains.

Further evidence includes: bryophytes on the Eastern Arc having affinities to Madagascar, which has been isolated from mainland Africa for at least 70 million years; and a shrew in the Udzungwa Mountains having its nearest relatives in the Congo Basin forests, separated for at least 10 million years. The African tailor bird is the only African member of an Asian bird family and the endemic Udzungwa Partridge has its closest relatives in Asia. Similar biogeographical disjunctions across large distances around the world are also known in the invertebrates, for example in the dragonflies. This information and some further examples of evolutionary and biogeographical processes are summarized in **Table 3**.

Many of the restricted range species that are found within the Eastern Arc Mountains occur in only a few localities, or are found throughout much of the Arc, but have extremely narrow altitudinal range (Lovett et al. 2001; Hall et al. 2009). The endemism comprises both newly evolved species and ancient relicts that have their origins in prehistoric times when a continuous swathe of forest was present across the whole of tropical Africa (Burgess et al. 2004). This unique biogeography of the Eastern Arc Mountains, and its disjunct nature in patches that are elevated above the surrounding landscape, give patterns in species distributions and range that are more similar to true islands than to a mainland region, causing it to be dubbed as 'The Galapagos of Africa'[5].

New species and genera continue to be discovered, for example a new genus of partridge *Xenoperdix* in 1991 (Dinesen et al. 1994) and a new genus of mangabey *Rungwecebus* in 2005 (Jones et al. 2005; Davenport et al. 2006), the first new genus of monkey to be described since 1923[6]. Another notable recent find includes a new species of giant elephant-shrew *Rhynchocyon udzungwensis* in 2005 (Rovero et al. 2008), as well as two new species of African Violet described in 2009[7]. All eight recognised species of African Violets (*Saintpaulia* spp.) are found in the Eastern Arc Mountains.

[5] E.g. http://www.africarainforest.org/article_galapagos.html Accessed January 2010.
[6] Than, Ker (May 11, 2006). "Scientists Discover New Monkey Genus In Africa". *LiveScience* website http://www.livescience.com/animals/060511_monkey_genus.html. Accessed January 2010.
[7] Haston, E. M. (2009). *Saintpaulia ulugurensis. Curtis's Botanical Magazine* **26**(3): 270–276; Haston, E. M. (2009). *Saintpaulia watkinsii. Curtis's Botanical Magazine* **26**(3): 277–281.

Table 3 Examples of evolutionary and biographical processes found in sites in the serial nomination

Genus / Species	Evolutionary / Biogeographical Features	Amani NR	Chome PNR	Kilombero NR	Magamba PNR	Mkingu PNR	Udzungwa Mountains NP	Uluguru NR	Uzungwa Scarp pNR
BRYOPHYTES	Affinities to Madagascar bryophyte flora							present	
PLANTS									
Impatiens	Centre of radiation for this genus							present	
Saintpaulia	Centre of radiation for this genus	Present							
Saintpaulia	Centre of radiation for this genus							present	
Saintpaulia	Centre of radiation for this genus					present			
AMPHIBIANS									
Nectophrynoides	Center of radiation for this Eastern Arc endemic toad genus	Present							
Nectophrynoides	Center of radiation for this Eastern Arc endemic toad genus							present	
Nectophrynoides	Center of radiation for this Eastern Arc endemic toad genus								present
REPTILES									
Kinyongia tenue	One of four species of this East African forest endemic chameleon genus	Present							
BIRDS									
Sheppardia montana	Endemic species within an East African forest endemic genus				present				
Tailorbirds	Only African member of the tailorbirds of Asia	Present							
Xenoperdix udzungwensis	Partridge family birds with affinities to groups in Asia			present					
Xenoperdix udzungwensis	Partridge family birds with affinities to groups in Asia						present		
Zosterops winifredae	Example of recent speciation within a diverse bird genus		present						
MAMMALS									
Congosorex phillipsorum	Member of genus of shrew otherwise found only in Congo Basin			present					
Rhynchocyon udzungwensis	Giant form of this genus of East African endemic forest sengis			present			present		
Rungwecebus kipunji	Unique genus of African primate			present			present		

Criteria (x) Contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation

The Eastern Arc Mountains, covering an area of some 23,000 km^2, was first recognised in the 1990s as being within one of 25 global hotspots (Eastern Arc and Coastal Forests of Tanzania/Kenya) for biodiversity. Following a revision of the original set of hotspots by Conservation International (Mittermeier et al., 2005), the Eastern Arc Mountains are now placed within the Eastern Afromontane hotspot, one of 34 of the world's richest places for biodiversity found nowhere else and under extreme threat having lost 70% or more of their original vegetation.

The Eastern Arc Mountains rank among the world's top five sites for biodiversity for plants, herpetofauna, birds and mammals, despite their comparatively limited altitudinal range, as considered further in Section 3c. They also hold among the highest numbers and concentration of rare and endangered species and genera of flora and

fauna in the whole of Eastern Africa (Brooks et al. 2001; Burgess et al. 2004b; 2007), including some 1,000 plant taxa believed to be threatened with extinction (Gereau ad Luke, unpublished checklist) and 95 vertebrate species. According to recent analysis this is the highest concentration of threatened species in the world (Brooks et al., 2002).

Eastern Arc Mountains endemic and near-endemic species feature a number of 'flagship species'; including at least five primates (one species of Red Colobus monkey, two species of Mangabey monkey and two or three species of nocturnal Galago) and all known species of African violets (*Saintpaulia*).

The 9 sites comprising this serial nomination encompass a total area of 451,365 km^2, which represents approximately 20% of the Eastern Arc Mountains and includes at least 50% of the remaining 3,500 km^2 of forest. This series of core areas within the nominated property comprises 5 of the 6 largest protected areas in the Eastern Arc Mountains, all of which exceed 20,000 ha in area (see Annex 3). Ukwiva Forest Reserve in the Rubeho Mountain Block is the third largest site, covering 78,780 ha, but it is not included in this serial nomination primarily for reasons of its current designation and management.

The 9 core areas that comprise the World Heritage serial nomination are spatially well-distributed across the Eastern Arc Mountains (Map 1, Executive Summary) and feature much of the Outstanding Universal Value of these Mountains. They hold more than 53% of 554 plant taxa and 76% of 118 vertebrate species endemic to the Eastern Arc Mountains. Their habitats provide refuge to 77% of the 170 single-site endemic plant taxa and 70% of the 47 single-site endemic vertebrate species currently known to the be restricted in their distributions to a single block of the Eastern Arc Mountains.

The Outstanding Universal Values of each of these 9 core areas that comprise this serial nomination are considered in more detail below, together with the integrity of the site and the management that is in place and under development to ensure that the Outstanding Universal Values are safeguarded over the longer term.

Chome Nature Reserve

Outstanding universal values

The South Pare Mountains hold 54 (10%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are the sixth most important block, after the Udzungwa, Uluguru, West Usambara, Nguru and East Usambara Mountains, with respect to Eastern Arc Mountain endemic plants. A total of 6 taxa (1% of Eastern Arc Mountain endemics) are restricted to the South Pare, of which 2 taxa are recorded only from the proposed Chome Nature Reserve.

Endemic plants species restricted in their distribution (unique) to this site:

Family	Species	Authority
Rubiaceae	*Pentas hindsioides var. parensis*	Verdc.
Gesneriaceae	*Streptocarpus parensis*	B.L. Burtt

The South Pare Mountains hold 8 (7%) of the 118 vertebrate species endemic to the Eastern Arc Mountains. A total of 1 endemic vertebrate species is restricted to the South Pare Mountains, a threatened (VU) bird (*Zosterops winifredae*), which is recorded only from the proposed Chome Nature Reserve.

Threatened species within the South Pare Mountains include 5 vertebrates, of which all 5 species are found in the proposed Chome Nature Reserve, including 4 endemic to the Eastern Arc Mountains.

Other outstanding values: Chome has qualified as one of Tanzania's Important Bird Areas due to the presence of two important species: South Pare White-eye, endemic to the South Pare Mountains and listed as vulnerable; and Hunter's Cisticola (restricted range species, Endemic bird area 109).

Protection and management of OUV

Legal provisions for protection: Biodiversity, catchment, production and amenity zones proposed in 2001 draft management plan. Utilisation of exotic species (invaders) is allowed in the production zone by communities, but not otherwise.

Buffer zones: There is no buffer zone as the surrounding area is largely settled and farmed. However, there are scattered forest patches owned by village councils, village clans, local government and private individuals, which help to buffer the proposed Nature Reserve, for example Chongweni, Maganda, Kirangahengae and Gonja. Trees such as *Acacia mearnsii* and *Eucalyptus spp.* are commonly planted for fuel wood. Agro-forestry is being encouraged to reduce pressures on natural forest.

Other provisions: In the community use zone, sustainable utilisation of forest resources (dead fuel wood, medicinal plants, etc) is allowed on a controlled basis.

Integrity with respect to OUV

The proposed Chome Nature Reserve is the largest block of forest remaining within the South Pare Mountains and, at 14,283 ha, is considered to be sufficiently extensive to be viable in terms of its diverse and, to some extent, unique flora and fauna.

Magamba Nature Reserve

Outstanding universal values

The West Usambara Mountains hold 144 (26%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are third in importance after the Udzungwa and Uluguru mountains with respect to their diversity of Eastern Arc Mountain endemic plants. A total of 37 taxa (7% of Eastern Arc Mountain endemics) are restricted to the West Usambara Mountains, of which 1 species is recorded only from Magamba Nature Reserve.

Endemic plant species restricted in their distribution (unique) to this site:

Family	Species	Authority
Cycadaceae	*Encephalartos sclavoi*	De Luca & D.W. Stev. & A. Moretti

The West Usambara Mountains hold 21 (18%) of the 118 vertebrate species endemic to the Eastern Arc Mountains. They are fifth in importance after the Udzungwa, Uluguru, East Usambara and Nguru, mountains with respect to their diversity of Eastern Arc Mountain endemic vertebrates. A total of 4 endemic species are restricted to the West Usambara Mountains, of which one endangered bird species is recorded only from Magamba Nature Reserve.

Endemic vertebrate species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Birds	*Sheppardia montana*	EN

Threatened species within the West Usambara Mountains include 24 vertebrates, of which 8 species are found in Magamba, including 6 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection:

Buffer zones: *Acacia meansii* (black wattle) covers the area between the reserve boundary and settlements. To the north, east and west the areas are bordered by Shume forest plantation, Hambalawei plantation, Magamba plantation, Evangelical Lutheran Church of Tanzania and the Roman Catholic Mazinde Juu Secondary School. The southern part is buffered by State House forest and commercially-owned woodlots (i.e. Chambogo forest).

Other provisions: Natural regeneration will be promoted in degraded forests; and fire devastated areas will be planted with indigenous tree species. The few plantation blocks (*Pinus patula*) remaining within the Nature Reserve will be harvested and all exotic tree species will be removed to allow for natural regeneration. Village Environmental Committees will be established in surrounding villages to promote Government's Joint Forest Management approach.

Integrity with respect to OUV
Magamba is the largest forest fragment remaining with the West Usambara Mountains. Other significant forest tracts lie within Shagayu Forest Reserve (7,830 ha) and Mafi Hill Forest Reserve (2,509 ha), an outlier to the main mountain block that is isolated by the surrounding farmland. Currently, only Magamba is being upgraded to Nature Reserve status.

Amani Nature Reserve

Outstanding universal values
The East Usambara Mountains hold 123 (22%) of the 554 plant taxa endemic to the Eastern Arc Mountains. Thus, it is fourth in importance after the Udzungwa, Uluguru and West Usambara mountains with respect to its diversity of Eastern Arc Mountain endemic plants. A total of 36 taxa (7% of Eastern Arc Mountain endemics) are restricted to the East Usambara Mountains, of which 16 taxa are recorded only from Amani Nature Reserve.

Endemic plant species restricted in their distribution (unique) to this site:

Family	Species	Authority
Orchidaceae	*Ancistrorhynchus parviflorus*	Summerh.
Begoniaceae	*Begonia zimmermannii*	Peter ex Irmsch.
Sterculiaceae	*Cola usambarensis*	Engl.
Fabaceae	*Cynometra longipedicellata*	Harms
Vitaceae	*Cyphostemma njegerre*	(Gilg & H.C. Strauss) Desc.
Orchidaceae	*Disperis egregia*	Summerh.
Moraceae	*Dorstenia bicaudata*	Peter
Fabaceae	*Englerodendron usambarense*	Harms
Acanthaceae	*Justicia oblongifolia*	(Lindau) M.E. Steiner
Rubiaceae	*Psychotria pocsii* ssp. *pocsii*	
Rubiaceae	*Psychotria scheffleri*	K. Schum. & K. Krause
Rubiaceae	*Rytigynia dichasialis*	Lantz & Gereau
Rubiaceae	*Rytigynia xanthotricha*	(K. Schum.) Verdc.
Rutaceae	*Vepris ngamensis*	I. Verd.
Melastomataceae	*Warneckea erubescens*	(Gilg) Jacq.-Fél.
Melastomataceae	*Warneckea microphylla*	(Gilg) Borhidi

Threatened plant species found in Amani include 8 species of the Genus *Saintpaulia* (African violet), *Leptonychia usambarensis*, *Cephalosphaera usambarensis and Allanblackia stulhmanii*.

The East Usambara Mountains hold 32 (27%) of the 118 vertebrate species endemic to the Eastern Arc Mountains. It is fourth in importance after the Udzungwa, Nguru and Uluguru mountains with respect to its diversity of Eastern Arc Mountain endemic vertebrates. A total of 7 endemic species are restricted to the East Usambara Mountains, of which 2 amphibians (including the critically endangered *Parhoplophryne usambarica*) and 1 reptile are recorded only from Amani Nature Reserve.

Endemic vertebrate species restricted in their distribution (unique) to this site:

Group	Species	Threat status

Amphibians	*Nectophrynoides frontierei*	
Amphibians	*Parhoplophryne usambarica*	CR
Reptiles	*Typhlops usambaricus*	

There are 35 threatened vertebrate species within the East Usambara Mountains, of which 23 species are found in Amani, including 12 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection: Amani is protected from commercial exploitation. Collection of firewood and medicinal plants is allowed in its Botanical Garden. Medicinal plants are the only product they may be collected from elsewhere within the Nature Reserve.

Buffer zones: Some 310 ha of buffer zone has been established peripheral to the Nature Reserve and inside its enclaves, with high priority given to promoting agroforestry. The specific policy objective of the buffer zone is: "*To promote sustainable land and natural resource use practices through implementation of the Village Management Plans, farm forestry activities and tree planting, to decrease the dependency of the local communities on the natural resources of the ANR."*

Other provisions: The proposed Derema Forest Reserve is planned as a corridor to maintain gene flow by linking Amani with Kambai Forest Reserve and its adjacent forests. Management measures will be taken to control and, where possible, eliminate exotic invasive species from the Nature Reserve.

Integrity with respect to OUV

Amani is considered to be the largest forested block of natural habitat remaining in the East Usambaras. It is connected to two other forest reserves, Kambai (1,060 ha) and Semdoe (980 ha), by Derema corridor (986 ha) which is due to designated a forest reserve. Kihuhwi and Kihuhwi Sigi forest reserve, both forest plantations, abuts its south-eastern boundary and connect with its eastern boundary, respectively.

Nilo Nature Reserve

Outstanding universal values

The East Usambara Mountains hold 123 (22%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are fourth in importance after the Udzungwa, Uluguru and West Usambara mountains with respect to their diversity of Eastern Arc Mountain endemic plants. A total of 36 taxa (7% of Eastern Arc Mountain endemics) are restricted to the East Usambara Mountains, of which 1 species is recorded only from Nilo Nature Reserve (see below).

Family	Species	Authority
Acanthaceae	*Justicia palustris*	Hochst.) T. Anderson

The East Usambara Mountains hold 32 (27%) of the 118 vertebrate species endemic to the Eastern Arc Mountains. They are fourth in importance after the Udzungwa, Nguru and Uluguru mountains with respect to their diversity of Eastern Arc Mountain endemic vertebrates. A total of 7 endemic species are restricted to the East Usambara Mountains, of which one endangered bird species (*Hyliota usambarae*)is recorded only from Nilo Nature Reserve.

Threatened species within the East Usambara Mountains include 35 vertebrates, of which 22 species are found in Nilo, including 10 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection: Nilo is protected as a Nature Reserve and no harvesting of forest products is allowed in the Biodiversity Zone. Collection of dead and fallen wood, mushrooms,

vegetables and medicinal plants for local consumption is allowed in the Community Use Zone.

Buffer zones: There are a number of Village Forest Reserves, including Kizingata and Mzungui VFRs in Zirai and Kizerui villages and the proposed Village Forest Reserve of Mfundia in Magoma Division, that are effectively community buffer forest strips around the Nature Reserve. There are also buffer strips at Kizerui Village, Magunga-Mziya Village (approximately 250 m wide), Kitivo-Makumba and Bosha Kwemtindi that require legal recognition. Communities will be encouraged to prepare simple management plans, with provisions in buffer zones to conserve traditional species of tree crops, fruit trees and multipurpose trees. Use of traditional species to establish woodlots as alternative sources of wood will also be promoted.

Other provisions: Natural regeneration of trees species will be encouraged, especially species such as *Ocotea usambarensis* that are disappearing from the East Usambaras. Gaps in the forest, from where *Cannabis sativa, Cardamom, Lantana camara and* tobacco have been removed, will be planted with *Khaya anthotheca, Newtonia buchananii, Albizia* spp and *Allanblackia stulhmani.* Exotic invasive tree species will be removed. On farm forestry, with planting of *Allanblackia stulhmanii*, will be encouraged among village communities to reduce pressures on forest resources inside the Nature Reserve.

Integrity with respect to OUV

Nilo is the second largest block of forest under protection in the East Usambaras, after Amani Nature Reserve. The central ridge that runs along Nilo's southern leg is planned to link up with Amani Nature Reserve via Derema forest corridor, which is due to be notified a Forest Reserve.

Both Nilo and Amani nature reserves are part of the East Usambara Biosphere Reserve, established in 2000 and covering a total area of 90,000 ha, of which 30,000 ha is core area and 12,000 ha is buffer zone.

Uluguru Nature Reserve

Outstanding universal values

The Uluguru Mountains hold 211 (38%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are on a par with the Udzungwa Mountains as being the most important mountain blocks with respect to Eastern Arc Mountain endemic plants. While the Udzungwa Mountains hold more endemic plant taxa than the Uluguru Mountains, the latter have more taxa that are endemic to the block then the former. A total of 80 taxa (38% of Eastern Arc Mountain endemics) are restricted to the Uluguru Mountains, of which 68 taxa are recorded only from Uluguru Nature Reserve. Notable is the genus *Impatiens* for which the Ulugurus are a centre of radiation. Of the 13 endemic species of *Impatiens* found within Uluguru Nature Reserve, 8 restricted in their distribution to this site. There are also 3 endemic species of African violet – *Saintpaulia.*

Endemic plant species restricted in their distribution (unique) to this site:

Family	Species	Authority
Malpighiaceae	*Acridocarpus congestus*	Launert
Theaceae	*Balthasaria schliebenii* var. *schliebenii*	
Begoniaceae	*Begonia schliebenii*	Irmsch.
Pteridophyta	*Blotiella coriacea*	Verdc.
Orchidaceae	*Bulbophyllum gilgianum*	Kraenzl.
Rubiaceae	*Chassalia lukwangulensis*	Thulin
Rubiaceae	*Chassalia violacea*	K. Schum.
Rubiaceae	*Chassalia violacea* var. *parviflora*	Verdc.
Rubiaceae	*Chassalia violacea* var. *violacea*	
Acanthaceae	*Dicliptera grandiflora*	Gilli
Melastomataceae	*Dionychastrum schliebenii*	A. & R. Fern.
Pteridophyta	*Diplazium ulugurense*	Verdc.
Moraceae	*Dorstenia ulugurensis*	Engl.

Melastomataceae	*Gravesia hylophila*	(Gilg) A. & R. Fern.
Aquifoliaceae	*Ilex mitis var. schliebenii*	Loes.
Balsaminaceae	*Impatiens barbulata*	G.M. Schulze
Balsaminaceae	*Impatiens humifusa*	G.M. Schulze
Balsaminaceae	*Impatiens palliderosea* var. *palliderosea*	
Balsaminaceae	*Impatiens pseudohamata*	Grey-Wilson
Balsaminaceae	*Impatiens serpens*	Grey-Wilson
Balsaminaceae	*Impatiens simbiniensis*	Grey-Wilson
Balsaminaceae	*Impatiens thamnoidea*	G.M. Schulze
Balsaminaceae	*Impatiens tricaudata*	G.M. Schulze
Oleaceae	*Jasminum rotundatum*	Knobl.
Rubiaceae	*Lasianthus macrocalyx*	K. Schum
Rubiaceae	*Lasianthus wallacei*	E.A. Bruce
Campanulaceae	*Lobelia graniticola*	E. Wimm.
Campanulaceae	*Lobelia lukwangulensis*	Engl.
Rubiaceae	*Pavetta bruceana*	Bremek.
Rubiaceae	*Pavetta constipulata*	Bremek.
Rubiaceae	*Pavetta constipulata* var. *constipulata*	
Rubiaceae	*Pavetta constipulata* var. *uranoscopa*	Bremek.
Rubiaceae	*Pavetta filistipulata*	Bremek.
Euphorbiaceae	*Phyllanthus thulinii*	Radcl.-Sm.
Pittosporaceae	*Pittosporum goetzei*	Engl.
Lamiaceae	*Plectranthus strangulatus*	A.J. Paton
Orchidaceae	*Polystachya longiscapa*	Summerh.
Orchidaceae	*Polystachya lukwangulensis*	P.J. Cribb
Orchidaceae	*Polystachya porphyrochila*	J.L. Stewart
Rubiaceae	*Psychotria cephalidantha*	K. Schum.
Rubiaceae	*Rhipidantha chlorantha*	(K. Schum.) Bremek.
Rubiaceae	*Rytigynia lichenoxenos* ssp. *lichenoxenos*	
Rubiaceae	*Rytigynia nodulosa*	(K. Schum.) Robyns
Gesneriaceae	*Saintpaulia goetzeana*	Engl.
Gesneriaceae	*Saintpaulia inconspicua*	B.L. Burtt
Gesneriaceae	*Saintpaulia ulugurensis*	Haston
Gesneriaceae	*Saintpaulia watkinsii*	Haston
Asteraceae	*Senecio dentatoalatus*	Mildbr. ex C. Jeffrey
Asteraceae	*Senecio subfractiflexus*	C. Jeffrey
Turneraceae	*Stapfiella ulugurica*	Mildbr.
Orchidaceae	*Stolzia angustifolia*	Mansf.
Orchidaceae	*Stolzia atrorubra*	Mansf.
Orchidaceae	*Stolzia moniliformis*	P.J. Cribb
Orchidaceae	*Stolzia oligantha*	Mansf.
Orchidaceae	*Stolzia viridis*	P.J. Cribb
Gesneriaceae	*Streptocarpus albus* ssp. *edwardsii*	(Weigend) I. Darbysh.
Gesneriaceae	*Streptocarpus bullatus*	Mansf.
Gesneriaceae	*Streptocarpus euanthus*	Mansf.
Gesneriaceae	*Streptocarpus heckmannianus*	(Engl.) I. Darbysh.
Gesneriaceae	*Streptocarpus heckmannianus* ssp. *gracilis*	(E.A. Bruce) I. Darbysh.
Gesneriaceae	*Streptocarpus heckmannianus* ssp. *heckmannianus*	
Gesneriaceae	*Streptocarpus subscandens*	(B.L. Burtt) I. Darbysh.
Rubiaceae	*Tarenna quadrangularis*	Bremek.
Orchidaceae	*Tridactyle phaeocephala*	Summerh.
Orchidaceae	*Tridactyle sarcodantha*	Mansf.
Meliaceae	*Turraea mombassana* ssp. *schliebenii*	(Harms) Styles & F. White
Asteraceae	*Vernonia tricholoba*	C. Jeffrey

Fabaceae	*Zenkerella perplexa*	Temu

The Uluguru Mountains hold 39 (33%) of the 118 vertebrate species endemic to the Eastern Arc Mountains, which makes them third in importance after the Udzungwa and Nguru mountains with respect to their diversity of Eastern Arc Mountain endemic vertebrates. A total of 12 endemic vertebrate species (10%) are restricted to the Uluguru Mountains, of which 8 species are recorded only from Uluguru Nature Reserve. These include 2 critically endangered species (Uluguru bush-shrike *Malaconotus alius* and the reptile *Nectophrynoides cryptus*) and 3 other threatened species.

Endemic vertebrate species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Amphibians	*Nectophrynoides cryptus*	EN
Amphibians	*Nectophrynoides laevis*	
Amphibians	*Probreviceps uluguruensis*	VU
Reptiles	*Prosymna ornatissima*	CR
Reptiles	*Typhlops uluguruensis*	
Birds	*Andropadus neumanii*	
Birds	*Malaconotus alius*	CR
Birds	*Nectarinia loveridgei*	EN

Protection and management of OUV

Legal provisions for protection: Timber and other forms of natural resource harvesting are not permitted within the Nature Reserve. In practice, firewood and medicinal plants are collected under permit for domestic consumption purposes only. In future, this will be restricted to within 50 m inside of the Nature Reserve boundary.

Buffer zones: Currently none except for patches of forest, degraded forest, woodland and some sacred forests

Other provisions: Villagers have agreed to establish a 500 m buffer of forest peripheral to the Nature Reserve boundary. This awaits approval from the District authorities.

Integrity with respect to OUV

Uluguru Nature Reserve is the fourth largest protected area within the Eastern Arc Mountains and comprises one of the largest blocks of natural forest and other habitat remaining within the Eastern Arc Mountains. Connectivity between the North and South Ulugurus is now being restored by the re-afforestation of the Bunduki Corridor, an area of 106.5 ha that was cultivated previously by farmers from four nearby villages (Uluguru Landscape Management Framework, 2009; MNRT 2009).

Mkingu Nature Reserve

Outstanding universal values

The Nguru Mountains hold 137 (25%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are the fifth most important block, after the Udzungwa, Uluguru and West and East Usambara Mountains, with respect to Eastern Arc Mountain endemic plants. A total of 28 taxa (5% of Eastern Arc Mountain endemics) are restricted to the Nguru Mountains, of which 19 taxa are recorded only from the proposed Mkingu Nature Reserve.

Endemic plants species restricted in their distribution (unique) to this site:

Family	Species	Authority
Balsaminaceae	*Impatiens messumbaensis*	G.M. Schulze

Balsaminaceae	*Impatiens messumbaensis ssp. fimbrisepala*	Grey-Wilson
Balsaminaceae	*Impatiens messumbaensis ssp. messumbaensis*	
Campanulaceae	*Lobelia ritabeaniana*	E.B. Knox
Celastraceae	*Maytenus nguruensis*	N. Robson & Sebsebe
Euphorbiaceae	*Meineckia nguruensis*	(Radcl.-Sm.) Brunel ex Radcl.-Sm.
Euphorbiaceae	*Phyllanthus rhizomatosus*	Radcl.-Sm.
Orchidaceae	*Diaphananthe orientalis*	(Mansf.) F.N. Rasm.
Orchidaceae	*Mystacidium nguruense*	P.J. Cribb
Orchidaceae	*Polystachya canaliculata*	Summerh.
Orchidaceae	*Polystachya rugosilabia*	Summerh.
Pteridophyta	*Lellingeria rupestris*	Parris
Rubiaceae	*Chassalia bonifacei*	Thulin & S. Manktelow
Rubiaceae	*Chassalia christineae*	Thulin & S. Manktelow
Rubiaceae	*Pavetta abyssinica ssp. viridiflora*	Bridson
Rubiaceae	*Psychotria pocsii ssp. ferruginea*	Borhidi & Verdc.
Rubiaceae	*Rytigynia longituba*	Verdc.
Sapindaceae	*Chytranthus longibracteatus*	F.G. Davies
Vitaceae	*Cyphostemma masukuense ssp. nguruense*	Verdc.

The Nguru Mountains hold 46 (39%) of the 118 vertebrate species endemic to the Eastern Arc Mountains. They are on a par with the Udzungwa Mountains in terms of being the two most important mountain blocks for Eastern Arc Mountain endemic vertebrates. The Ngurus have slightly more Eastern Arc endemics than the Udungwas but comparatively fewer endemic their block. A total of 14 endemic vertebrate species are restricted to the Nguru Mountains, of which 11 are recorded only from the proposed Mkingu Nature Reserve. Many of these species have been discovered in the last few years and are in the process of being described (Menegon et al. 2008).

Endemic animal species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Amphibians	*Arthroleptis nguruensis*	Not threatened
Amphibians	*Callulina sp. 1*	Not assessed
Amphibians	*Callulina sp. 2*	Not assessed
Amphibians	*Callulina sp. 3*	Not assessed
Amphibians	*Hoplophryne sp.*	Not assessed
Amphibians	*Nectophrynoides sp. 1*	Not assessed
Amphibians	*Nectophrynoides sp. 2*	Not assessed
Amphibians	*Nectophrynoides sp. 3*	Not assessed
Amphibians	*Probreviceps sp.*	Not assessed
Amphibians	*Scolecomorphus sp.*	Not assessed
Reptiles	*Rhampholeon acuminatus*	Not threatened

Threatened species within the Nguru Mountains include 26 vertebrates, of which 25 species are found in the proposed Mkingu Nature Reserve, including 17 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection:

Buffer zones: There is currently no buffer zone as the Reserve is surrounded mostly by degraded woodland and a few patches of degraded forest. In the west some extensive Miombo woodland is separated from the proposed Nature Reserve by village settlements. There is a possibility of managing this woodland as a buffer zone and/or establishing buffer zones on farmland by means of agroforestry, tree planting and tree retention schemes.

Other provisions: There are no corridors to connect Mkingu to other reserves because the Nature Reserve is surrounded by villages, Turiani town and commercial sugar cane and rice plantations.

Integrity with respect to OUV
The proposed Mkingu Nature Reserve is the fourth large protected area within the Eastern Arc Mountains and by far the largest block of forest remaining within the Nguru Mountains Block.

Kilombero Nature Reserve

Outstanding universal value
The Udzungwa Mountains hold 221 (40%) of the 554 plant taxa endemic to the Eastern Arc Mountains. Thus, they are the most important block with respect to Eastern Arc Mountain endemic plants. A total of 144 taxa (14% of Eastern Arc Mountain endemics) are restricted to the Udzungwa Mountains, of which 1 species is recorded only from Kilombero Nature Reserve.

Endemic species restricted in their distribution (unique) to this site:

Family	Species	Authority
Rubiaceae	*Pavetta roseostellata*	Bridson

The Udzungwa Mountains hold 44 (37%) of the 118 vertebrate species endemic to the Eastern Arc Mountains, which is more than any other mountain block. A total of 19 endemic vertebrate species (16%) are restricted to the Udzungwa Mountains, of which the critically endangered shrew *Congosorex phillipsorum* is recorded only from Ndundulu Forest in Kilombero Nature Reserve.

Endemic species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Mammals	*Congosorex phillipsorum*	CR

Threatened species within the Udzungwa Mountains include 50 vertebrates, of which 29 species are found in Kilombero, including 12 endemic to the Eastern Arc Mountains.

Protection and management of OUV
Legal provisions for protection:
Buffer zones: There is natural forest and/or exotic woodlots on village lands surrounding the Nature Reserve which are available to meet community needs for firewood and non-timber forest products. Such areas require demarcation as buffer zones. However, a number of villages are too close to the Nature Reserve to establish an intervening buffer zone. Thus, in the eastern part of Kilombero, a 60 m buffer zone will be demarcated inside the Nature Reserve for regulated use by village communities, while in the western part forests and woodlots within village lands will provide the buffer to the Nature Reserve.
Other provisions:

Integrity with respect to OUV
Kilombero is the second largest protected area within the Eastern Arc Mountains, after Udzungwa Mountains National Park. It is largest forested mountain block of the Udzungwa Mountains and abuts Udzungwa National Park to the north-east, with which it is integral. Plans are underway to establish a corridor to link the Nature Reserve with Uzungwa Scarp Forest Reserve to the south-west. Currently, the Mngeta Corridor is used for farming activities by Mhanga, Uluti, Itonya, Mngeta, Mchombe and Mkangawalo villages (MNRT 2009a).

Udzungwa Mountains National Park

Outstanding universal values

The Udzungwa Mountains hold 221 (40%) of the 554 plant taxa endemic to the Eastern Arc Mountains. They are on a par with the Uluguru Mountains as being the most important mountain blocks with respect to Eastern Arc Mountain endemic plants. The Udzungwa Mountains hold more endemic plant taxa but fewer are endemic to the block than in the case of the Uluguru Mountains. A total of 144 taxa (14% of Eastern Arc Mountain endemics) are restricted to the Udzungwa Mountains, of which 17 taxa are recorded only from Udzungwa Mountains National Park.

Family	Species	Authority
Asteraceae	*Blepharispermum canescens*	T. Erikss.
Orchidaceae	*Disperis elaphoceras*	Verdc.
Euphorbiaceae	*Erythrococca sanjensis*	Radcl.-Sm.
Acanthaceae	*Isoglossa imbricata*	Brummitt
Acanthaceae	*Justicia beloperonoides*	Lindau
Campanulaceae	*Lobelia udzungwensis*	Thulin
Sapindaceae	*Placodiscus pedicellatus*	F.G. Davies
Orchidaceae	*Polystachya melliodora*	P.J. Cribb
Rubiaceae	*Pyrostria uzungwaensis*	Bridson
Celastraceae	*Salacia lovettii*	N. Hallé & B.Mathew
Triuridaceae	*Seychellaria africana*	Vollesen
Rubiaceae	*Tarenna uzungwaensis*	Bridson
Annonaceae	*Toussaintia patriciae*	Q. Luke & Deroin
Orchidaceae	*Tridactyle flabellata*	P.J. Cribb
Orchidaceae	*Tridactyle minuta*	P.J. Cribb
Rubiaceae	*Vangueriopsis longiflora*	Verdc.
Asteraceae	*Vernonia luhomeroensis*	Q. Luke & Beentje

The Udzungwa Mountains hold 44 (37%) of the 118 vertebrate species endemic to the Eastern Arc Mountains, which is second to the Nguru Mountains. A total of 19 endemic vertebrate species (16%) are restricted to the Udzungwa Mountains, of which 3 reptiles are recorded only from Udzungwa Mountains National Park. Udzungwa Mountains is Tanzania's only national park with as many as 10 species of primate, two of which are endemic to the mountain block and endangered. They are the Udzungwa red colobus (*Piliocolobus gordonorum*) and the Sanje mangabey (*Cercocebus sanjei*).

Endemic species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Reptiles	*Kinyongia magomberae*	Not threatened
Reptiles	*Leptosiaphos rhomboidalis*	Not threatened
Reptiles	*Urocotyledon rasmusseni*	Not threatened

Threatened species within the Udzungwa Mountains include 50 vertebrates, of which 29 species are found in Udzungwa Mountains National Park, including 16 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection: The visitor experience is limited to camping and hiking. Permanent accommodation for visitors is not permitted inside the National Park.
Buffer zones: Kilombero NR, farmland
Other provisions: None.

Integrity with respect to OUV

Udzungwa Mountains National Park is contiguous with Kilombero Nature Reserve, which is the largest forested block of the Udzungwa Mountains, and its integrity will be enhanced once Mngeta Corridor has been established

to connect Kilombero with Uzungwa Scarp proposed Nature Reserve in the south-west. The National Park is the largest and has the greatest altitudinal range of any protected area within the Eastern Arc Mountains.

Uzungwa Scarp Nature Reserve

Outstanding universal value

The Udzungwa Mountains hold 221 (40%) of the 554 plant taxa endemic to the Eastern Arc Mountains. Thus, they are the most important block with respect to Eastern Arc Mountain endemic plants. A total of 144 taxa (14% of Eastern Arc Mountain endemics) are restricted to the Udzungwa Mountains, of which 6 species are recorded only from Uzungwa Scarp proposed Nature Reserve.

Endemic species restricted in their distribution (unique) to this site:

Family	Species	Authority
Ancistrocladaceae	*Ancistrocladus tanzaniensis*	Cheek & Frim.
Rubiaceae	*Coffea kihansiensis*	A.P. Davis & Mvungi
Ebenaceae	*Diospyros uzungwaensis*	Frim. & Ndang.
Balsaminaceae	*Impatiens uzungwaensis*	Grey-Wilson & Frim
Triuridaceae	*Kihansia lovettii*	Cheek
Triuridaceae	*Kupea jonii*	Cheek

The Udzungwa Mountains hold 44 (37%) of the 118 vertebrate species endemic to the Eastern Arc Mountains, which is more than any other mountain block. A total of 19 endemic vertebrate species (16%) are restricted to the Udzungwa Mountains, of which 6 threatened species of amphibians are recorded only from Uzungwa Scarp proposed Nature Reserve.

Endemic species restricted in their distribution (unique) to this site:

Group	Species	Threat status
Amphibians	*Hyperolius kihangensis*	EN
Amphibians	*Hyperolius kihangensis*	EN
Amphibians	*Nectophrynoides asperginis*	CR
Amphibians	*Nectophrynoides poyntoni*	CR
Amphibians	*Nectophrynoides wendyae*	CR

Threatened species within the Udzungwa Mountains include 50 vertebrates, of which 37 species are found in the Uzungwa Scarp proposed Nature Reserve, including 22 endemic to the Eastern Arc Mountains.

Protection and management of OUV

Legal provisions for protection:

Buffer zones: The north eastern side of the reserve is buffered by woodland which could be managed as a buffer zone through participatory forest management. On the western side of the reserve there is the potential for buffer zone activities including tree planting and agroforestry.

Other provisions: Detailed research has been carried out into the feasibility of establishing a corridor between the proposed Uzungwa Scarp Nature Reserve and the Kilombero Nature Reserve to the north-east via the 'Mngeta Corridor', which comprises natural vegetation. This corridor is currently used for farming activities by Mhanga, Uluti, Itonya, Mngeta, Mchombe and Mkangawalo villages.

Integrity with respect to OUV

Uzungwa Scarp is the fourth largest protected area within the Eastern Arc Mountains, after Udzungwa Mountains National Park (199,000 ha), Kilombero Nature Reserve (134,511 ha) and, not included in the nominated property, Ukwiva Forest Reserve (78,780 ha). Once linked by the Mngeta Corridor to Kilombero

Nature Reserve (St John 2008), which abuts Udzungwa Mountains National Park, it will be part of the largest forested block within the Udzungwa Mountains as well as the entire Eastern Arc Mountains system.

3.b Proposed Statement of Outstanding Universal Value

The Eastern Arc Mountains, encompassing an area of some 23,000 km^2, are part of the Eastern Afromontane hotspot, one of 34 of the world's richest places for biodiversity that are under continuing extreme threat of loss of their original vegetation. This arc of mountains is geologically ancient, dating back at least 30 million years and possibly 100 million years, and individual blocks are isolated from each other, with the result that they have played an important role as refugia for plants and animals, and as centres of speciation over the millennia.

The Eastern Arc Mountains and Forests of Tanzania property proposed for inscription on the World Heritage List is a series of 9 protected areas within 6 of the 13 blocks that comprise the Eastern Arc Mountains, as follows:

Serial site	Mountain Block
Amani Nature Reserve	East Usambara
Nilo Nature Reserve	East Usambara
Mkingu Proposed Nature Reserve	Nguru
Chome Proposed Nature Reserve	South Pare
Kilombero Nature Reserve	Udzungwa
Udzungwa Mountains National Park	Udzungwa
Uzungwa Scarp Proposed Nature	Udzungwa
Uluguru Nature Reserve	Uluguru
Magamba Proposed Nature Reserve	West Usambara

These 9 sites encompass a total area of 451,365 ha, which represents approximately 20% of the Eastern Arc Mountains and includes at least 50% of the remaining 3,500 km^2 of forest. The sites have been selected for inclusion in the nomination as being, on the basis of current knowledge, universally outstanding examples of evolutionary and biogeographical processes, as well as having a wealth of species of plants and animals (vertebrates) that are endemic to the Eastern Arc Mountains and in numerous cases endemic to an individual site within the serial property.

This serial property is nominated on the basis of the following criteria:

Criterion (ix)

The property features important biological refugia, having numerous endemic taxa representing ancient lineages that have survived millions of years of climatic fluctuations elsewhere on the African continent, as well as being centres of more recent speciation and radiation. For example, all of the world's African violet (*Saintpaulia*) species are located in the forests of these mountains and many are endemic to the area.

DNA analysis has shown that the property provides a globally important record of the evolution of life on earth, especially for ancient groups of birds, mammals, reptiles and amphibians having 30 million year old and older radiations. Such evidence is based on there being at least 40 genera of plants and at least 6 genera of vertebrates that are endemic to the Eastern Arc Mountains.

The endemism comprises both newly evolved species and ancient relicts that have their origins in prehistoric times when a continuous swathe of forest was present across the whole of tropical Africa. This unique biogeography of the Eastern Arc Mountains, and its disjunct nature in patches that are elevated above the surrounding landscape, give patterns in species distributions and range that are akin to true islands, causing it to be dubbed as 'The Galapagos of Africa'.

Criterion (x)

> The Eastern Arc Mountains rank among the world's top five sites for their diversity of plants, herpetofauna, birds and mammals when compared with 21 tropical forest World Heritage sites. They also hold among the highest numbers and concentration of rare and endangered species and genera of flora and fauna in the whole of Eastern Africa, including some 1,000 plant taxa believed to be threatened with extinction and 95 vertebrate species, reputedly the highest concentration of threatened species in the world. Much of this diversity is found within the serial sites, including 'flagship species'; such as five primate species (Red Colobus monkey, two species of Mangabey monkey and two or three species of nocturnal Galago) and all known species of African violets (*Saintpaulia*).
>
> The 9 core areas that comprise the World Heritage serial nomination are spatially well-distributed across the Eastern Arc Mountains and hold more than 53% of 554 plant taxa and 76% of 118 vertebrate species endemic to the Eastern Arc Mountains. Their habitats provide refuge to 77% of the 170 single-site endemic plant taxa and 70% of the 47 single-site endemic vertebrate species currently known to be restricted in their distributions to a single mountain block of the Eastern Arc. Thus, each of the nominated core areas holds from 1 to 68 plant taxa and 1-11 vertebrate species that are unique (endemic) to that site.

The 9 serial sites contain examples of each of the main types of forest habitat within the Eastern Arc Mountains. The Udzungwa Mountains National Park and Kilombero Nature Reserve contain the full altitudinal range of the forest from lowland forest at 200 m, through sub-montane, montane and upper montane forest, to montane grasslands, heathlands and bogs above the tree line. Drier and ecologically unique montane woodlands are present on the lee slopes of Udzungwa Mountains, and there are important assemblages of xerophytic plants, including endemic species, growing on exposed rocky outcrops.

The series of sites encompass at least 50% of the remaining natural habitat in the Eastern Arc Mountains, including true wilderness where there are no visible human impacts and large mammals, such as elephant, buffalo and lion, are still found living at high altitudes. The 9 sites are intact and have no people living inside their boundaries.

Five of the 6 largest remaining patches of protected habitat in the Eastern Arc Mountains are included in the serial nomination, each of the 5 exceeding 23,000 ha and the rest ranging from approximately 6,000 ha to 14,000 ha. The two largest sites in the series are contiguous (Udzungwa National Park and Kilombero Nature Reserve) and plans are underway to link Kilombero Nature Reserve with the nearby proposed Uzungwa Scarp via Mngeta Corridor to provide a contiguous area in excess of 366,000 ha within the Udzungwa Mountain Block. This would amount to 16% of the total area of the Eastern Arc Mountains. There are also plans to link the two smallest nature reserves, Amani and Nilo, via Derema Corridor to create a contiguous unit of at least 14,600 ha.

Peripheral to the boundaries of these 9 core areas and, indeed, all natural forests within the Eastern Arc Mountains are numerous settlements and extensive areas of cultivation, providing little or no short-term opportunity for establishing adjacent buffer zones.

While there is effectively only 4,000 ha of de facto buffer zone (national Forest Reserves) peripheral to the core areas, local authority and village Forest Reserves cover an estimated 7,924 ha in the vicinity of the 9 serial sites. These forests meet some of the livelihood needs of village communities and, thereby, play an important role in reducing pressures on the forests protected for biodiversity and watershed conservation purposes. Good progress is also being made in encouraging village communities to establish buffer strips outside and contiguous with the boundary of nature reserve.

Much more extensive is the network of national Forest Reserves within each mountain block, amounting to some 126,873 ha, which provide 'stepping stones', 'corridors' and refuges to plants and animals, all of which contributes to the maintenance and exchange of genetic diversity.

The 9 serial sites comprise 8 nature reserves under the management of the Forestry and Beekeeping Division (FDB), of which 3 are in the process of being legally notified in 2010, and 1 national park under the management the Tanzania National Parks (TANAPA). All of these protected areas have management plans, with one

exception (Uzungwa Scarp) that is being prepared in 2010. The national park management plan is currently under revision.

Management plan objectives focus primarily on biodiversity conservation and also water conservation and provision, along with visitor management, research, education, outreach and enforcement. Over the last few years there have been significant increases in investment, both in staff numbers and capital expenditure. This trend is due to increase exponentially over the next five years for the recently and newly established nature reserves.

Across the Eastern Arc, the communities surrounding the forests are also involved in the management of the forest resources. This management takes the form of Joint Management agreements in about 50% of the protected areas, whereby communities enter into an agreement with the Forestry and Beekeeping Division for the management of the area. There is also an increasing number of Village Land Forest Reserves in the Eastern Arc, especially in the East and West Usambara and Udzungwa Mountain blocks.

3.c. Comparative Analysis

Global comparisons

The Eastern Arc Mountains Forests of Tanzania rank extremely favourably against other tropical forest World Heritage properties around the world as summarised in **Table 4**. In terms of numbers of species, the Eastern Arc Mountains is the 6th most important for vascular plants on a global scale and has the highest actual species count for plants, compared to other sites where only estimates are available. No comparative data are available for the Discovery Atlantic Forests of Brazil or Canaima National Park in Venezuela, however, both of which may rank higher than the Eastern Arc Mountains. Nevertheless, this rank is particularly high within a biogeographical context since Africa has a depauperate forest flora compared to Malesia and the Neotropics (Rosenszweig 2002; Whitmore 1999).

Table 4: Comparison of species richness between the Eastern Arc Mountains Forests of Tanzania and 21 tropical forest World Heritage properties (sorted by habitat area)

World Heritage property	Location	Habitat (ha)	Altitude (m)	Vascular plants	Mammals	Birds	Reptiles & Amphibians	Data sources
Salongo National Park	D.R. Congo	3,600,000	350–700	?	?	>101	?	(4)
Tropical Rainforest Heritage	Sumatra	2,595,124	0–3805	>4000	201	580	200	(4) (11)
Lorentz National Park	Western Papua	2,350,000	0–5030		>100	411	150	(10)
Manu National Park	Peru	1,532,806	365–4000	2–5000	200–222	850	12 + >77	(10) (11)
Noel Kempff Mercado National Park	Bolivia	1,523,446	200–750	4,000	139	620	74 + 62	(4)
Kahuzi-Biega National Park	D.R. Congo	1,372,625	500–1000	?	194	224	48+31	(4) (11)
Transboundary Rainforest Heritage	Borneo	1,051,147	150–1960	2807	>54	>300	>112	(4)
Virunga National Park	D.R. Congo	790,000	680–5119	1938	218	706	109+78	(4) (11)
Darien & Los Katiós National Parks	Panama & Colombia	651,000	0–2500	2490 (Darien)	169 (Darien)	533 (Darien)	99 + 78 (Darien)	(10) (11)
Okapi Faunal Reserve	D.R. Congo	600,000	700–3308	670 woody plants	52	376	?	(4)
Talamanca Range – La Amistad Reserves	Costa Rica & Panama	568,627	50–3819	10,000	215	600	250	(11)
Dja Faunal Reserve	Cameroon	526,000	400–800	2000	109	429	?	(4) (11)
Sangay National Park	Ecuador	517,765	800–5319	>3000		400–500		(11)
Atsinanana Rainforests	Madagascar	479,660	0–2658	2598	74 (ex bats)	283	163 + 159	(4) (11)
Gondwana Rainforests	Australia	370,000	0–1600	1625	74	270	110	(4)
Eastern Arc Mountains Forests	**Tanzania**	**350,000**	**500–2638**	**3473**	**161**	**554**	**84 + 92**	**(1) (2) (3) (6)**
Tai National Park	Côte d'Ivoire	330,000	80–396	1300	140	250	35 + 53	(4)

Kinabalu National Park	Borneo	75,300	152–4095	5000–6000		326	(10)
Cerrado sites	Brazil	65,514	400–1650	2,077	78	>354	84 (4) (10)
Mount Nimba Nat.Reserve	Guinea & Côte d'Ivoire	17,740 + 31,020 buffer	450–1752	>2000	55	>72	>10 (4) (11)
Bwindi Impenetrable National Park	Uganda	32,092	1190–2607	>200 tree spp.	120	350	? (4) (11)
Sinharaja	Sri Lanka	8,864	270–1060		39	147	45 + 20 (5) (11)

Data sources: (1) Lovett, J.C. 1990; (2) Lovett, J.C. 1993; (3) WWF EcoRegions Database; (4) UNEP/WCMC 2007; (5) Sinharaja website http://www.sinharaja.4t.com/; (6) TROPICOS database figures courtesy of Dr. Roy E. Gereau; (7) Detailed data sheet on each endemic and threatened species originally compiled by Kim Howell of the University of Dar es Salaam, and updated by Jonathan Green of the University of Cambridge with data from Nisha Owen (BREAM) and Francesco Rovero (CEPF), January 2010; (8) http://albertinerift.org/portals/49/media/file/Biodiversity-7.pdf Accessed January 2010; (9) http://www.panda.org/about_our_earth/ecoregions/cameroon_highlands_forests.cfm Accessed January 2010; (10) UNESCO World Heritage Site Documents, available from www.unesco.org; (11) UNEP–WCMC Data sheets http://www.unep-wcmc.org/sites/wh/pdf/[name].pdf; (12) Detailed data sheet on each endemic and threatened species compiled by Michele Menegon, Museo Trento, January 2010. This includes 14 undescribed new amphibian species from Nguru mountains.

In terms of absolute numbers of vertebrate species, the Eastern Arc Mountains is the 6th most important site for reptile and amphibian diversity, 6th for bird diversity and 7th for mammal diversity, with the same caveat that no comparative data are available for the Discovery Atlantic Forests or Canaima National Park. Comparison of absolute numbers needs to be enhanced by by factoring in the size of an area, as more extensive sites can be expected to have a wide variety of habitats and micro-habitats and, therefore, host greater numbers of species. A tentative comparison can be made using the area correction equation $S=cA^z$, where S is the number of species, A is the habitat area, z is the species–area exponent obtained from the slope of the regression line of log S on log A, and c is a constant that describes the steepness of the S to A^z regression. Rosenzweig's (2002) review of studies on the species area relationship shows that z values of 0.12 to 0.18 are representative for mainland subdivisions. Applying the value of z = 0.12 (favours larger areas) to the dataset of tropical forest World Heritage properties (**Table 5**), the Eastern Arc Mountains ranks equal third in importance for vascular plants, equal fourth for both bird and reptile/amphibian diversity, and equal fifth most important site in terms of mammal diversity (**Table 5a**). The same rank order is obtained for the Eastern Arc Mountains if a value of z = 0.18 is applied, which favours small areas (**Table 5b**). Again, comparisons cannot be made with either Discovery Atlantic Forests or Canaima National Park.

Table 5: Ranking of Eastern Arc Mountains with respect to tropical forest World Heritage properties, according to their importance for vascular plant and vertebrate species diversity, adjusted for habitat area

(a) z = 0.12 (favours larger sites)

Rank (z=0.12)	Vascular plants	Mammals	Birds	Amphibians and Reptiles
1	Kinabalu, Borneo	Cerrado sites, Brazil	Cerrado sites, Brazil	Atsinanana, Madagascar
2	Cerrado sites, Brazil	Talamanca–La Amistad, Costa Rica & Panama	Virunga, D.R. Congo Manu, Peru	Cerrado sites, Brazil Talamanca–La Amistad, Costa Rica & Panama
3	**Eastern Arc Mts, Tanzania**	Virunga, D.R. Congo	–	–
4	Noel Kempff, Bolivia	Manu, Peru	Talamanca – La Amistad, Costa Rica & Panama **Eastern Arc Mts, Tanzania**	**Eastern Arc Mts, Tanzania** Virunga, D.R. Congo Darien, Panama
5	Tropical Rainforest, Sumatra	Kahuzi-Biega, D.R. Congo **Eastern Arc Mts, Tanzania** Bwindi, Uganda Darien, Panama Tropical Rainforest, Sumatra	–	–

(b) z = 0.18 (favours smaller sites)

Rank (z=0.18)	Vascular plants	Mammals	Birds	Amphibians and Reptiles
1	Cerrado sites, Brazil	Cerrado sites, Brazil	Cerrado sites, Brazil	Cerrado sites, Brazil
2	Kinabalu, Borneo	Talamanca-La Amistad, Costa Rica & Panama	Virunga, D.R. Congo	Atsinanana, Madagascar
3	Mount Nimba, Guinea & Liberia **Eastern Arc Mts, Tanzania**	Virunga, D.R. Congo Bwindi, Uganda	Manu, Peru	Talamanca – La Amistad, Costa Rica & Panama
4	–	–	Talamanca-La Amistad, Costa Rica & Panama **Eastern Arc Mts, Tanzania**	**Eastern Arc Mts, Tanzania** Darien, Panama Virunga, D.R. Congo
5	Tropical Rainforest, Sumatra	Manu, Peru **Eastern Arc Mts, Tanzania**	–	–

Fewer data are available for tropical forest World Heritage properties to compare endemism, with the additional problem of distinguishing between strict endemism and near-endemism, especially when examining properties that comprise a portion of formerly more extensive lowland forest areas. Using the limited data available for animals, the entire Eastern Arc Mountains ranks as the world's 2nd most important site in terms of absolute numbers of endemic reptiles and amphibians, and 5th most important site for both endemic birds and mammals (**Table 6**). Too few data are available to make a realistic comparison of endemic plant diversity.

Table 6: Comparison of endemic species richness between the Eastern Arc Mountains Forests of Tanzania and 21 tropical forest World Heritage properties (sorted by habitat area)

World Heritage property	Location	Habitat (ha)	Altitude (m)	Threatened species*	Endemic vascular plants	Endemic vertebrates (not birds)	Endemic birds	Data sources
Salongo National Park	D.R. Congo	3,600,000	350–700	1 CR 1 EN 4 VU	?			(4)
Tropical Rainforest Heritage	Sumatra	2,595,124	0–3805	19 CR 23 EN *45 VU	680	total 92 mammals 15	21	(4) (11)
Noel Kempff Mercado National Park	Bolivia	1,523,446	200–750	4 EN 6 VU	?			(4)
Kahuzi-Biega National Park	D.R. Congo	1,372,625	500–1000	1 CR 4 EN 7 VU	24		42	(4) (11)
Transboundary Rainforest Heritage	Borneo	1,051,147	150–1960	49 CR 29 EN 42 VU plants	75	Total 76 herps 40		(4)
Virunga National Park	D.R. Congo	790,000	680–5119	1 CR 4 EN 7 VU			24	(4) (11)
Okapi Faunal Reserve	D.R. Congo	600,000	700–3308	4 EN 6 VU	15%			(4)
Talamanca Range – La Amistad Reserves	Costa Rica & Panama	568,627	50–3819	Several hundred		total 48–63 mammals 13 herps 20	15–30	(11)
Dja Faunal Reserve	Cameroon	526,000	400–800	5 EN 10 VU	high	high	high	(4)
Atsinanana Rainforests	Madagascar	479,660	0–2658	9 CR 27 EN	85	Total 186 mammal 36 reptiles 74 amphibians 76	45	(4) (11)
Gondwana Rainforests	Australia	370,000	0–1600	1,625	9%	Total 67 mammals 22 herps 45		(4)
Eastern Arc Mountains Forests	**Tanzania**	**350,000**	**500–2630**	**13 CR 40 EN 42 VU animals**	**453**	**Total 82–96 mammals 12 reptiles 31 amphibians 53**	**21**	**(6) (7) (12)**
Tai National Park	Côte d'Ivoire	330,000	80–396	1 CR 8 EN 14 VU	150			(4)
Discovery Atlantic Forests	Brazil	111,930	0–536	Extremely high	?	?	200	(10)
Cerrado sites	Brazil	65,514	400–1650	2 CR 7 EN 16 VU	?			(4) (10)
Mount Nimba Nat.Reserve	Guinea & Côte d'Ivoire	17,740 + 31,020 buffer	450–1752	2 CR 7 EN 10 VU	16			(4) (11)
Bwindi Impen. National Park	Uganda	32,092	1190–2607	5 EN 7 VU				(4) (11)
Sinharaja	Sri Lanka	8,864	270-1060		140	mammals 8 herps 31	19	(5) (11)

*Threatened species categories: CR = **CR**itically endangered, EN = **EN**dangered, VU = **VU**lnerable (IUCN, 2009)

The statistics also suggest that the Eastern Arc Mountains have a higher number of threatened species (animals) than many of the other World Heritage properties compared in **Table 5**, many of which are known to be endemic to these Mountains. However, it is acknowledged that data are unavailable or not comprehensive for quite a number of properties, including plants in the case of the Eastern Arc Mountains.

African comparisons

Plant endemism in tropical Africa (excluding the Cape) peaks in upland mountain ranges, where the Eastern Arc has almost as many endemic plant species compared with the entire Albertine Rift, which is about 5 times larger and has a greater altitudinal range (**Table 7**). Eastern Arc vertebrate endemism compares favourably with the Albertine Rift (and Cameroon Highlands) and, in the case of reptiles, is higher than the Albertine Rift.

Table 7: Comparison of endemic species richness in African mountain forests (sorted by area of region)

Ecosystem	Broad area (ha)	Vascular plant endemics	Mammal endemics	Bird endemics	Reptile endemics	Amphibian endemics	Data sources
Albertine Rift	10,390,000	567	34	51	21		39 (3) (8)
Cameroon Highlands	3,800,000	>50	14	24	12		26 (9) (3)
Eastern Arc Mountains	**2,370,000**	**554**	**15**	**37**	**39**		**31 (6) (3)**

Kilimanjaro, Africa's highest mountain and a World Heritage, is located in Tanzania close to the Eastern Arc Mountains. It is relatively recent in geological origin (less than 2 million years) and its forests are not known to possess any strictly endemic species of vertebrates or plants. The only endemic species located on Kilimanjaro are in the montane heathlands and moorlands at high altitude, and these are all recently evolved from species that have managed to colonise through long distance aerial dispersal, for example giant lobelia, giant senecio and various insects. In comparison, the Eastern Arc Mountains are vastly richer in terms of narrowly endemic species of vertebrates, invertebrates and plants, and their forests have a very much longer history stretching back almost certainly 30 if not 100 million years.

3.d Integrity

The 9 sites comprising the serial nomination proposed for the Eastern Arc Mountains Forests of Tanzania World Heritage property contain the full range of altitudinal variation in habitats and biomes associated with this ecosystem, ranging from lowland forest to submontane, montane and upper montane forest, as well as high altitudinal grassland, wetlands and bogs. Drier and ecologically unique montane woodlands are present on the lee slopes of Udzungwa Mountains, and there are important assemblages of xerophytic plants, including endemic species, growing on exposed rocky outcrops.

The series of sites encompass at least 50 % of the remaining natural habitat in the Eastern Arc Mountains (precise data are not available). The more remote sites are true wilderness, with large mammals such as elephant, buffalo and lion still found living at high altitudes where there are no visible human impacts.

Five of the 6 largest remaining patches of protected habitat in the Eastern Arc Mountains are included in the serial nomination, each of the 5 exceeding 23,000 ha and the rest ranging from approximately 6,000 ha to 14,000 ha (see Annex 3). The two largest sites in the series are contiguous (Udzungwa National Park and Kilombero Nature Reserve) and plans are underway to link Kilombero Nature Reserve with the nearby proposed Uzungwa Scarp via Mngeta Corridor to provide a contigous area in excess of 366,000 ha within the Udzungwa Mountain Block. This would amount to 16% of the total area of the Eastern Arc Mountains. There are also plans to link the two smallest nature reserves, Amani and Nilo, via the Derema Corridor to create a contigous unit of at least 14,600 ha.

The 9 sites are intact and have no people living inside their boundaries. They are managed by the Forestry and Beekeeping Division, and Tanzania National Parks under the auspices of the Ministry of Natural Resources and Tourism. In the case of Amani Nature Reserve there are two long-established enclaves where progressive cooperation with the owners of a tea estate has resulted in some privately-owned natural forest being handed back to FBD.

Peripheral to the boundaries of these 9 core areas and, indeed, all natural forests within the Eastern Arc Mountains, however, are numerous settlements and extensive areas of cultivation, providing little or no short-term opportunity for establishing adjacent buffer zones.

While there is effectively only 4,000 ha of de facto buffer zone (national Forest Reserves) peripheral to the core areas, as summarised in Section 1.f, local authority and village Forest Reserves cover an estimated 7,924 ha in the vicinity of the 9 serial sites. These forests meet some of the livelihood needs of village communities and, thereby, play an important role in reducing pressures on the forests protected for biodiversity and watershed conservation purposes. Good progress is also being made in encouraging village communities to establish buffer strips outside and contiguous with the boundary of nature reserve.

Much more extensive is the network of national Forest Reserves within each mountain block, amounting to some 126,873 ha, which provide 'stepping stones', 'corridors' and refuges to plants and animals, all of which contributes to the maintenance and exchange of genetic diversity.

4. State of Conservation and factors affecting the property

4.a Present state of conservation

The State of Conservation within the Eastern Arc Mountains World Heritage property is closely tied to management policies and capacity of the government Forestry and Beekeeping Division and Tanzania National Parks.

The Forestry and Beekeeping Division manages its network of four Nature Reserves (172,500 ha) and four proposed Nature Reserves (80,000 ha) through the Nature Reserves Unit, based out of Morogoro and Dar es Salaam. Each Nature Reserve has a conservator and a staff provided by Forestry and Beekeeping Division and paid from central government funds. Nature Reserves are somewhat better funded than national Forest Reserves because they receive both funding from the central government, but also are able to fundraise and retain their own takings.

Tanzania National Parks manages the Udzungwa Mountains National Park (199,000 ha) from the Park headquarters in Mangula. It has a chief park warden and a staff to manage the park. The budget is provided by Tanzania National Parks from the proceeds of the profitable parks in the northern part of the country, mainly derived from tourism revenues.

Local people living around the Nature Reserves, proposed Nature Reserves and National Park in the Eastern Arc World Heritage property generally respect the reserve boundaries and do not encroach within the reserves to establish new farms. However, forest resources are used locally (and illegally) for the collection of fuel wood and building materials (planks, poles) and some forests are degraded. Fire is also a problem as it enters and can destroy these forests during the dry season. The various management agencies try and control these activities, and sometimes make local agreement s to allow some of the activities to proceed in return for local assistance in managing the reserves to a higher level of protection. This 'Joint Forest Management' approach has been implemented in the Amani, Kilombero and Uluguru Nature Reserve. It is also proposed for other Nature Reserves and proposed Nature Reserves as well.

4.b Factors affecting the property

(i) Development Pressures (e.g., encroachment, adaptation, agriculture, mining)

A prioritised list of the overall threats affecting the Eastern Arc Mountains has been developed through an extensive stakeholder process between 2004 and 2008. In terms of their area (extent), importance (severity) and required actions (urgency) a ranked list of the main threats is presented below. Most of these pressures / threats are related to human activities in the region, but not all can be termed development pressures as such.

Threat	Extent	Severity	Urgency	Total
Uncontrolled fire	10	9	10	29
Conversion of natural habitats to agriculture	9	10	9	28
Illegal logging	7	7	6	20
Unsustainable collection of firewood and building materials	8	6	7	21

Inappropriate mining practices	1	8	8	17
Illegal grazing	4	4	5	13
Unsustainable hunting/poaching	6	5	4	15
Unsustainable collection for the pet trade	3	1	3	7
Unsustainable collection of medicinal plants	5	3	2	10
Invasive species	2	2	1	5

Key to the overall ranking of threat

Very High	
High	
Medium	
Low	

Fire is a major challenge to the management of the Eastern Arc Mountain forests; fires often start on the lower slopes of the mountains and spread up the slope and towards the forest. Fires are frequent in the dry season, and reach their peak in the September / November period. In dry years the fire can enter the forest and destroy areas of pristine natural forest habitat., Controlling fire and preventing it entering the natural forest is one of the major management challenges for the Forestry and Beekeeping Division and Tanzania National Parks when managing their network of reserves.

Human population densities in the Eastern Arc Mountains are high and there is heavy pressure for agricultural land. Most unprotected forest has already been lost and encroachment also occurs into some reserves when management capacity is inadequate. For example, when local people realised in the early 1990s that an area of sub-montane forest in the northern Uluguru Mountains was not within the forest reserve, it was rapidly deforested for banana plantations and subsistence agriculture.

The Eastern Arc Mountains contain commercially valuable timber species, such as *Milicia excelsa, Khaya anthotheca, Beilschmedia kweo, Ocotea usambarensis* and *Podocarpus* spp. Many of these species have been logged on these mountains for more than a century, and in some parts of the region large specimens are commercially extinct. All timber harvesting from the Eastern Arc forests is illegal, as logging has been banned since 1985, but it is difficult to eliminate entirely.

People living on the slopes of the Eastern Arc Mountains and in nearby towns make use of forest resources to support their livelihoods. An important use of some forests is a source of firewood for cooking. Other uses include hunting, gathering medicinal plants, and as a place for traditional ceremonies – including burials.

Finally, across different Eastern Arc mountain blocks there are variable degrees of artisanal mining for gold, rubies, garnets and other semi-previous stones. During 2004/05 a gold rush has affected the East and West Usambaras and the Nguu Mountains, but this has been stopped.

Exotic species are also a threat where they can invade natural forest. *Lantana camara is found throughout the Eastern Arc and* prefers disturbed areas, mainly outside the of forest. In the East Usambara Mountains there is also the invasive tree *Maesopsis emeni,* and there is *Eucalyptus* in the Pare Mountains.

The specific threats to the individual components of the Eastern Arc Mountains World Heritage Site are outlined below:

Name	Main threats / management challenges
Chome proposed Nature Reserve	Logging of *Ocotea usambarensis* and *Podocarpus* species. Still an issue even despite efforts of central government to control. Fire spreading into the reserve and causing grassland and bracken dominated areas to expand at the expense of natural forest. Hunting animals for food.
Magamba proposed Nature Reserve	Logging of *Ocotea usambarensis* and *Podocarpus* species. Presence of exotic conifer plantations on the margins of the reserve. Hunting animals for food.
Nilo Nature Reserve	Small scale logging of timber species and the collection of firewood and minor forest products. Hunting animals for food.
Amani Nature Reserve	Gold mining along streams and in swampy areas was an issue in recent years. Small scale collection of forest products. Occasional fire spreading from lowlands into the forest on the drier western margins.
Mkingu proposed Nature Reserve	Underplanting of forest with cardamom. A forest enclave of farming people. Fires spreading from the lowlands into the forest on the southern margins. Some logging of valuable species. Hunting animals for food.
Uluguru Nature Reserve	Collection of firewood at higher altitudes. Logging of trees for timber and for the production of utensils in the forest above Morogoro town. Some invasion by *Rubus* species in the southern forests. Hunting animals for food.
Kilombero Nature Reserve	Hunting of larger mammals at low intensity, including poaching of elephants. Fires spreading from grasslands into forest areas.
Udzungwa Mountains National Park	Fires spreading from grasslands into forest areas. Increasing human populations need more firewood from the park and there is an increasing pressure for other resources as well. Presence of exotic teak trees in the natural forest.
Uzungwa Scarp proposed Nature Reserve	Hunting pressure on larger mammals, including endemic monkeys. Logging of trees for timber. Cutting of woody materials as firewood and building poles.

(ii) Environmental pressures (e.g., pollution, climate change, desertification)

The Eastern Arc Mountains do not suffer very much from pollution. It is not believed that there is any impact on the natural habitats of the forests or grasslands. There is also very little industry and not much use of agricultural fertilizers or pesticides. Rivers that flow in areas of high population density outside the forest areas might have moderate levels of pollution – from human excrement and from washing clothes.

The Eastern Arc is likely to be heavily impacted by climate change in the coming years. Although the region of East Africa is predicted to get somewhat wetter, it will also get hotter. This climatic change is predicted to drive some of the species up the mountains, and potentially out of available climate space. As such some of the narrowly endemic high mountain specialists may suffer adversely, or even become extinct. However, it is hard to generalise as the mountains are highly topographically varied and it could be possible that all species will be able to survive in tiny habitat remnants, for example in valleys or gullies and hence maintain populations even under climatic changes.

There is not going to be any impact of desertification on the Eastern Arc Mountains. This is because the Eastern Arc is well away from the regions that are suffering from deforestation.

(iii) Natural disasters and risk preparedness (earthquakes, floods, fires, etc.)

The Eastern Arc Mountains do not suffer from earthquakes, cyclones of major floods.
The Mountains are somewhat prone to landslides and landslips. But this does not cause a major impact on the forests, except for in a few exceptionally unstable areas.

The main natural disaster is fire. In dry years the mountains are susceptible to pressure from fires that spread up the mountains from the lowlands and can enter the forests and destroy large areas. Fire is used by local people to clear farms and make areas suitable for hunting. When these fires get out of control (or are purposely set by troublemakers) then high levels of damage to the forests can occur.

(iv) Visitor/tourism pressures

The current number of tourists visiting the Eastern Arc Mountains is estimated from a partial survey completed in 2008 to be at least 10,201 tourists spending at least one night in 6 of the Eastern Arc Mountain blocks in 2007. Of these it is estimated that at least 1,500 and perhaps as many as 3,000 visit the forest. Tourists mainly go to the West Usambara, East Usambara and Udzungwa ranges. Some also visit the Ulugurus, mainly from Morogoro. Very few tourists visit the other mountain blocks. Some students and researchers also visit the Amani Nature Reserve Centre in Amani, or the Udzungwa Mountains Ecological Research Centre in Mangula (close to the Udzungwa Mountains National Park).

(v) Number of inhabitants within the property and the buffer zone

There are 1.5 million people living in the Eastern Arc Mountains, located within 15 Districts. This is all within the buffer zone of the forest area. It is not sure how many of these people have a direct relationship to, and utilise, the forests of the Eastern Arc Mountains. But in the Uluguru Mountains at least – fully 50 villages with a population of over 50,000 people are immediately adjacent to the mountain forests that are included within the Eastern Arc WH site.

Estimated population located within:

Area of nominated property **The property contains no people living permanently**

Buffer zone (reserves in mountain block containing core sites) **1,250,000**

Total human population within relevant mountain blocks = **1,250,000**

5. Protection and Management of the Property

5.a Ownership

The core elements of the proposed World Heritage property (Udzungwa Mountains National Park and the four existing and four proposed Nature Reserves) are all owned and managed by the central government through the Ministry of Natural Resources and Tourism.

Udzungwa Mountains National Park covers 199,000 ha and managed by the Tanzania National Parks (TANAPA), a parastatal organisation of the Ministry of Natural Resources and Tourism. TANAPA was established in 1959 through the national parks ordinance and is now under the National Parks Act Cap. 282 of 2002. All matters relating to the establishment and gazettment, degazettment and change of purpose of a National Parks fall under this Act. National Parks are established after consent of parliament and gazettment must be endorsed by the President. TANAPA receives no funds from government and in fact pays corporate tax to the treasury. TANAPA took management of the Udzungwa Mountains National Park area in 1992, after the park was created from three national Forest Reserves that had previously been managed by the Forestry and Beekeeping Division of the same Ministry of government.

The four gazetted Nature Reserves (Kilombero - Udzungwa, Uluguru - Uluguru, Nilo and Amani – East Usambara; covering 173,231 ha) and the four proposed Nature Reserves (Mkingu - Nguru, Magamba – West Usambara, Uzungwa Scarp – Udzungwa and Chome – South Pare; covering 82,080 ha) are managed by the Nature Reserves Unit of the Forestry and Beekeeping Division of the Ministry of Natural Resources and Tourism. These Nature Reserves have largely been created by re-gazetting, upgrading and amalgamating a number of national Forest Reserves managed by the same Division of government.

The buffer zone areas around the core sites within the Eastern Arc World Heritage property consist of some national Forest Reserves managed the catchment forest programme of the Forestry and Beekeeping Division, or are local authority Forest Reserves managed by District councils and under the Prime Ministers Office for Regional and Local Government (PMO-RALG).

The potential to include additional sites in the future that meet criteria of Outstanding Universal Value, but which do not have adequate management in place has also been considered here. All the sites that might ultimately be included are national Forest Reserves under the management of the Forestry and Beekeeping Division of government. As such they are owned by the same agency involved with the original set of sites.

5.b Protective designation

The Udzungwa Mountains National Park is declared by an act of Parliament and has existed since 1992. This legislation only permits tourism and photography and limited research. No utilisation is allowed. Udzungwa Mountains National Park was gazetted on 20th March 1992 (Government Notice No. 39) as an IUCN category II protected area. Copies of the gazettment are attached to this dossier.

The four declared Nature Reserves within the Eastern Arc have been gazetted by the government of Tanzania. Copies of the published gazettment notices are included in this dossier, but the relevant summary details are as follows:

Amani – Government Notice no. 152 of the 8th May 1997 (map JB no. 2260). IUCN cat. Ib
Nilo - Government Notice no. 234 of the 7th December 2007 (map JB no. 2229). IUCN cat 1b
Kilombero - Government Notice no. 182 of the 17 August 2007 (map JB no. 2525). IUCN cat 1b
Uluguru - Government Notice no. 296 of the 7th November 2008 (map JB no. 2541). IUCN cat IV

The four proposed Nature Reserves are all in the final stages of gazettment the relevant gazettment notices will be published during 2010. Of these Mkingu (JB 2620a), and Uzungwa Scarp are proposed as IUCN category 1b protected areas, and Chome and Magamba as category IV protected areas. Even without re-gazettment as Nature Reserves all these areas already exist legally in the form of gazetted national Forest Reserves, and all have existed in this legal status for at least 40 years. Hence they are extremely well established and legally secure.

Nature Reserves in Tanzania are managed by the Forestry and Beekeeping Division of the Ministry of Natural Resources and Tourism according to the Forest Policy of 1998 and the Forest Act No.14 of 2002. These legal instruments, and their associated regulations, provide the mechanism and guidance for broad scale management of the sites. The legal provisions state that the reserves are to be managed for protection of the forest habitat and the species of plants and animals that live within these reserves. No extraction of woody materials is allowed. Agreements for co-management can be negotiated with forest-adjacent communities.

There are also a number of other policies and laws that are relevant to the management of the Eastern Arc Mountains region. Some of these are Environmental Policy and Environmental Law (2007); Land Policy (1999), Land act and Village Land Act (1999); Wildlife Policy (revised 2008) and Wildlife Conservation Act (2009); Tourism Policy (2008) and Tourism Act (2008), Tanzania National Park policy (1994).

5.c Means of implementing protective measures.

Protective measures within the proposed Eastern Arc Mountains Forests of Tanzania World Heritage Site are implemented through a framework of policies, legislations, regulation and strategies. These are translated on the ground by the relevant management agencies (TANAPA and FBD) through the development of overarching management strategies and site-based management plans. This section of the dossier presents summary information on the main overarching policies and management plans that provide the means to implement protective measures on the ground.

National Forest Programme

The National Forest Programme outlines broad goals for forest management in Tanzania. This programme document was completed in 2002 and provides guidance and targets for forest management to be implemented by all stakeholders in Tanzania (central and local government, private sector, individuals). Those parts of the National Forest Programme that relate to the management of natural forests are summarised below.

Sub-programme	Key Issues[8]	Key Strategies
1.1 Participatory Forest Resources Management and Gender Aspects[9]*	• Ineffective forest management due to the lack of involvement, motivation and benefits to local communities, private sector and other stakeholders. (H) • *Inadequate gender aspect in forestland management. (H)*	• Establish Community Based Forest Management and Joint Forest Management (CBFM and JFM) by using innovative ways to share the costs and benefits and by assessing the economic, financial and social viability of participatory initiatives. Pay attention to gender balance in terms of income generation opportunities, poverty reduction, decision-making and ownership of forest resources and products. • Collaborate with local governments in the management of forests in the general lands and

[8] H = High priority M = Medium priority L = Low priority
[9] * = Priority Sub-programmes

Sub-programme	Key Issues[8]	Key Strategies
		local government forest reserves. • Involve specialized executive agencies, private sector and local governments by commercialization or privatization of the management of existing industrial plantations through concessions and leases. • Expand existing plantations and promote tree planting in private farmlands.
1.2 Forest Biodiversity Conservation and Management*	• Degradation and erosion of biodiversity due to shifting cultivation overgrazing, monoculture, wildfires and poaching. (H) • Inadequate application of indigenous knowledge in biodiversity conservation. (M)	• Assess forest biodiversity sites and habitats with high endemism and species richness under major ecozones and create conservation strategies and joint management agreements • Demarcate and manage protective buffer zones around gazetted forest and nature reserves with biodiversity, water and other amenity values in collaboration with local communities through JFM
1.3 Land Use Planning	• Undefined land use and security of tenure of forestlands in village and general land. (H) • Land scarcity due to population pressure and its negative effects on forest development (L).	• Develop clear ownership for all forests and trees on general lands. • Demarcate forest reserves under central, local government, village and private individuals and grant appropriate user rights.
1.4 Forest Resources Information and Management Planning	• Inadequate data on available forest resources for utilisation, and baseline data for conservation and management purposes. (H) • Management plans non-existent or outdated or not implemented. (H) • Inadequate information on ecosystems (forest biodiversity, water catchment and soil conservation). (H) • Outdated and non-existent management plans in watershed and soil conservation areas. (H) • Inadequate collection, analysis interpretation, dissemination, storage and updating of forest resource information. (H)	• Streamline forest resources information systems by assessing the current databases/registries and priority needs for new forest resource information. • Conduct forest inventories and develop management plans together with the relevant stakeholders in priority plantations and natural forest areas. • Establish new, cost-effective ways to conduct and prepare forest reconnaissance inventories, biological surveys and zonation and prepare low cost management plans.
1.5 Forest Resources Utilisation	• Inefficient utilisation of plantations. (H) • Potential for forest products, non-wood forest products (NWFP) and services (including eco-tourism, woodfuel) not fully	• Commercialise or privatize the management of existing plantations through concessions, leases and joint management and use fully the plantation potential in terms of quantity and quality. • Assess and promote utilization of forest products, NWFPs and services for wider use and income-generation, especially among the rural communities.

Sub-programme	Key Issues[8]	Key Strategies
	assessed/utilised. (M) • *Heavy dependency on few species for raw material supply for forest-based industry. (L)*	• Assess and create awareness on lesser-known species for wider utilization.

Eastern Arc Conservation Strategy

For the Eastern Arc there is one strategic document that defines management needs, targets, and activities to achieve sustainable conservation of the entire region. This was developed over 4 years through a detailed participatory process with all relevant stakeholders from village to national levels. As such this document provides a framework for management and suggests a management structure that might be able to implement that framework. The conservation strategies identified in the Eastern Arc Strategy document that have been identified to address the priority threats facing the Eastern Arc are as follows:

Main elements of the Eastern Arc Conservation Strategy

Main threat	Strategies identified	Comments
Uncontrolled Fire	Raise awareness and support fire control measures	Fire is a huge problem to control. Solving it requires concerted action at village, District and Regional levels. Actions by FBD and other protected area managers are also important.
Agriculture expansion and illegal grazing	Gazette upper catchment areas	Most forest is in reserves. Concerted action is needed by FBD to gazette proposed national Forest Reserves, by Districts to gazette proposed local authority Forest Reserves, and by villages to declare new Village Forest Reserves.
	Multisectoral collaboration	Weak sectoral coordination allows people into forests where they cause problems – e.g. miners. A high level committee between Ministries aims at concerted and coordinated action across the Eastern Arc.
	Land use planning at the village level	Some forest remains on village land and could be managed as Village Forest Reserves. However, most villages are not yet formally surveyed and do not have agreed land use plans where forest areas are set aside for sustainable use or conservation.
Illegal logging	Promoting the effectiveness of Participatory Forest Management	PFM is a major strategy for conservation management in the Eastern Arc, involving local people in management of the forests. Although operational, it needs to be improved to deliver further benefits for people and for forest conservation, for example in controlling illegal logging.
	Promoting alternative economic activities	Logging is illegal in the Eastern Arc Mountain forests. However, illegal logging generates important revenue in some communities. Hence there is a need to provide alternative economic activities for communities to reduce the demand for logging income.
Unsustainable collection of Firewood and Building Materials	Expand village land, community based, and private fuel wood plantations	Fire wood and building poles are a major use of natural forests in the Eastern Arc. Setting aside land for fast growing trees that are suitable for firewood and building materials could help take pressure off the remaining natural forests to supply these resources
Illegal Mining	Strengthen management	Mining takes place in some Forest Reserves where it

	capacity and raise awareness	causes much damage. Mechanisms are needed to solve conflicts between miners and foresters.
Illegal hunting and poaching	Promote hunting control with PFM Agreements	PFM is a major conservation management strategy in the Eastern Arc mountains. If the prevention of illegal hunting could be included in the PFM agreements, it might be possible to better control hunting of rare animals.
Invasive Alien species	Reduce expansion of invasive species	Non-native plants are invading Eastern Arc forests and grasslands, especially where there is a lot of human disturbance. Knowing the scale of the problem and starting to address it is increasingly important.
Unsustainable collection for pet trade	Situation Analysis and Education and Awareness	Endemic animals are collected from the Eastern Arc forest and sold to Europe, USA and the Far East as household pets. There are export quotas, but these are not well enforced. Knowing if the pet trade has an impact on key species is becoming and important issue
Reducing water quality and quantity	Water flow and quality	The Eastern Arc has national importance for providing water. Information on water flows and water quality is often old and unreliable. Refurbishing and maintaining the hydrological monitoring network, and gathering monitoring data is critical.
Insufficient awareness	Information, education and awareness	Conservation awareness is low in the Eastern Arc. It is important that people can make conservation decisions based on improved awareness of the values of the Eastern Arc and available management options
Insufficient finance	Sustainable finance	Funding provided for management of the Eastern Arc is small and often comes from time-limited projects. A source of sustainable funding for management is critical if long-term forest conservation is to be improved.
Adverse climate change	Climate change mitigation	Climate changes are predicted to impact on Eastern Africa and may have dramatic negative consequences for the region. Most of the solutions lie beyond Tanzania's borders, but Tanzania needs to undertake conservation activities with due consideration of the potential climate change impacts.

Management Plans for Individual Sites

At the operational level of implementation, the work to be done to achieve conservation of the World Heritage is outlined in detailed management plans. These plans are developed according to national guidelines and define the management required at each site. They are outlined below.

National Parks. The Udzungwa Mountains National Park has an approved management plan from 2001. This is in the process of being revised and is expected to be finished by June 2010. A copy of the current plan is provided with this nomination dossier.

Nature Reserves.

As per existing laws and guidelines the management of protected forests should be done in participatory manner. For that aspect, preparation and implementation of the management plans use participatory approaches. The custodian of the reserves are conservators, Regional Catchment Managers, District Catchment Managers, District Natural

Resource officers or chair of the forest committees for the case of Village and community forest Reserves. The status of the management plans for the various Nature Reserves is outlined below.

Amani Nature Reserve (first plan 1999, updated 2007). Under implementation.
Nilo Nature Reserve (first plan 2009). Under implementation.
Uluguru Nature Reserve (first plan 2008, together with landscape management framework 2008). Under implementation.
Kilombero Nature Reserve (first plan 2009). Under implementation.

Mkingu proposed Nature Reserve (first plan 2009). Awaiting gazettment.
Magamba proposed Nature Reserve (first plan 2009). Awaiting gazettment.
Chome proposed Nature Reserve (first plan 2003, updated plan 2009). Awaiting gazettment.
Uzungwa Scarp proposed Nature Reserve (first plan under development). Awaiting gazettment.

5.d Existing plans related to municipality and region in which the proposed property is located (e.g., regional or local plan, conservation plan, tourism development plan)

The Eastern Arc Mountains area contains five administrative regions and 15 Districts.

Each Region develops a plan for the management of the land under its control. However, the role of the Regions has been reduced through decentralisation and the Regional Secretariats are now mainly advisory in nature.

Within each District there is a development plan that is revised every 5 years. These plans define the priorities of the Districts. Although the Eastern Arc World Heritage Site is made up of reserves that are owned and managed by central government agencies, the plans of the district are relevant as many of the management challenges facing the conservation of the Eastern Arc and the communities surrounding the reserves.

In terms of a conservation plan for the Eastern Arc region, the Eastern Arc Strategy document (see above) developed by the Forestry and Beekeeping Division of the Ministry of Natural Resources and Tourism serves that purpose. The plan has been discussed and agreed at each of the 15 districts and 5 regions across the Eastern Arc.

As far as we are aware, there are no regional tourism plans for the area. However, there are local tourism initiatives in the South Pare, Uluguru and Udzungwa Mountains, which aim to boost the number of people visiting these mountains.

5.e Property management plan or other management system

Property Management Plan

The Eastern Arc Mountains region of Tanzania also has an official management strategy; which was developed by Forestry and Beekeeping Division of the Government of Tanzania with support from UNDP-GEF over the period 2004-2008 and was published in 2009. Main elements of this plan are outlined above. This strategy document covers all the protected forests managed by the Forest and Beekeeping Division within the Eastern Arc Mountains and have strong links to those managed by Tanzania National Parks Authority (Udzungwa and Mikumi National Parks). The document has text that defines the values of the area, the threats face, and the main conservation strategies to address the threats. An action plan is also developed to ensure that the conservation

actions follow logically from the agreed strategies. Since being developed the Eastern Arc strategy is now under implementation by FBD and is being rolled out to the Districts of the Eastern Arc Mountains as well.

Management System.

The proposed site comprises one National Park managed by the National Parks authority and a series of eight Nature Reserves managed by the Forest and Beekeeping Division – both of the Ministry of Natural Resources and Tourism.

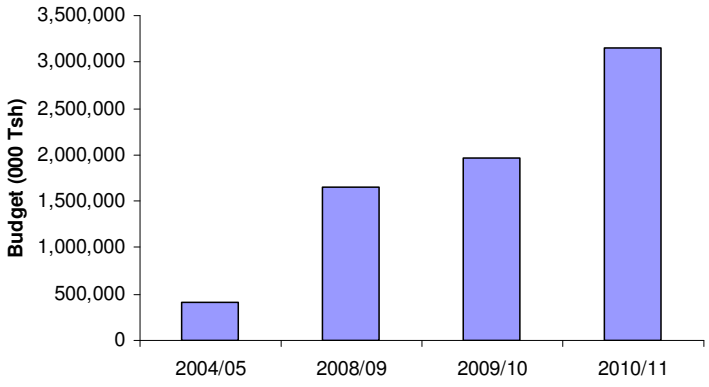
The Nature Reserves Unit will provide the management system for the eight Nature Reserves. The Nature Reserves unit is housed in the 'Eastern Arc Conservation Centre' in Morogoro, and is overseen by the head of catchment and Nature Reserves sections based at the FBD headquarters in Dar es Salaam. This center also houses the 'Eastern Arc Mountains Conservation Endowment Fund' which is an independent permanent funding mechanism for conservation in the Eastern Arc. It is proposed that the centre could also form the administrative base for the management secretariat of the World Heritage Site. The government is also in the process of planning the establishment of the Tanzania Forest Service and the Tanzania Forest Fund, aimed at enhancing the capacity of FBD. Funding for the Udzungwa Mountains National Park is generated from tourism fees and from donor funding to a limited extent.

5.f Sources and levels of finance

The core funding for the management of the Eastern Arc World Heritage property (the network of existing reserves) comes from the Government of Tanzania (Central and Local Government). In some of the Eastern Arc forests there is also donor funding to assist management input. This has been dramatically reduced in the past few years. The catchment forest programme of the Forestry and Beekeeping Division (the manager of most of the reserves in the Eastern Arc) has also been receiving funding for the past years from the Norwegian Government. This funding allows some enhanced management of the catchment forest reserves.

The funding available for the management of the core sites within the Eastern Arc Mountains has increased over time, and is currently around four times the allocation in 2004. This is proposed to increase still further. Even allowing for depreciation of the Tanzanian shilling this is still in major increase in funding commitment to the management of these sites.

Figure 8 Funding allocated to the nine sites in the proposed Eastern Arc Mountains Forests of Tanzania World Heritage Site from 2004/05-2010/11



At the same time as this increase from the Tanzanian government, the support to forest conservation from donors has declined dramatically.

Table 8. Budget details for the nine sites of the proposed Eastern Arc Mountains Forests of Tanzania World Heritage site

Mtn Block	Protected Area	Financial Year		Government expenditure (T.Shs) 000												External funding
				Capital/development expenditure						Recurrent expenditure						
				Physical resources						Salaries		office	Publicity	Vehicle	Others	
	Guidance & budget		Total T.Shs (000s)	Buildings/ tourist facilities	Procurement (vehicles /equipment)	Forest operations	Buffer zones/community participation / IGAs	Training	Inter-sectoral co-operation	Permanent	Temporary	Rent, services	Extension material	Maintenance & fuel		Total (T.Shs)
E. Usambara	Amani NR	2008/09	1,000	0	0	0	0	0	0		0	0	0	1,000		298,400
E. Usambara	Amani NR	2009/10	168,045	11,600	12,000	90,310	28,565	12,550	780		2,125	0	10,115	0		347,000
E. Usambara	Amani NR	2010/2011	173,107	12,300	12,000	92,960	21,365	20,000	1,080		2,337		11,065	0		360,000
E. Usambara	Nilo NR	2008/09	39							39						82
E. Usambara	Nilo NR	2009/10	46							46						2,286
E. Usambara	Nilo NR	2010/2011	99							99						1,842
Uluguru	Uluguru NR	2008/09	113				84			29						84
Uluguru	Uluguru NR	2009/10	41							41						156
Uluguru	Uluguru NR	2010/2011	55							55						23
Nguru	Mkingu PNR	2008/09	0													355,558
Nguru	Mkingu PNR	2009/10	241,226			148,450	5,000			29,386		10,440	18,350	29,600		21,180
Nguru	Mkingu PNR	2010/2011	1,479,290	390,850	522,000	254,100	39,000	56,500		31,350		14,040	117,100	54,350		
S.Pare	Chome PNR	2008/09	131,200	0	0		0	0	0	0	131,200	0	0	0	0	

S.Pare	Chome PNR	2009/10	1,882	360	940	20	365		0	0	130	10	48	9	0	42
S.Pare	Chome PNR	2010/2011	2,428	666	903	237	269	126	0	0	131	10	35	51	0	
Udzungwa	Kilombero NR	2008/09	70,160	0	0	5,500	0	0	0	49,060	6,000	0	0	9,600	0	56,755
Udzungwa	Kilombero NR	2009/10	72,560	0	0	4,000	0	0	0	57,960	6,800	800	0	3,000	0	36,900
Udzungwa	Kilombero NR	2010/2011	213,280	31,000	20,000	51,000	5,000	10,000	3,000	66,780	15,000	0	0	11,500	5,000	
Udzungwa	Uzungwa PNR	2008/09	29,750	0	0	2,100	0	0	0	26,000	800	0	0	850	0	
Udzungwa	Uzungwa PNR	2009/10	33,030	0	0	800	0	0	0	27,980	750	0	0	3,500	0	
Udzungwa	Uzungwa PNR	2010/2011	95,490	23,000	10,000	21,100	0	1,500	1,900	28,090	4,000	0	0	5,900	0	
W. Usambara	Magamba PNR	2008/09	635,335	10,965	281,120	132,149	90,816	2,205	10,655	73,966	0	0	22,058	11,400	0	
W. Usambara	Magamba PNR	2009/10	539,739	41,965	162,300	57,648	41,751	121,400	10,655	73,966	0	0	13,054	17,000	0	
W. Usambara	Magamba PNR	2010/2011	295,599	30,965	1,563	30,400	12,266	107,730	10,655	73,966	0	0	13,054	15,000	0	
Udzungwa	Udzungwa NP	2008/09	783,430	119,000						664,430						
Udzungwa	Udzungwa NP	2009/10	900,000	100,000						800,000						90,000
Udzungwa	Udzungwa NP	2010/2011	0													

5.g Sources of expertise and training in conservation and management techniques

Tanzania has a number of higher education institutions that provide training in conservation and management techniques. There are three Universities and a number of technical training colleges:

Sokoine University of Agriculture. This University is located in Morogoro and provides training at BSc, MSc and PhD levels. The faculty of Forestry and Nature Conservation has courses on natural and plantation forest management, and also on nature conservation and the management of natural resources within parks and reserves.

University of Dar es Salaam. The University of Dar es Salaam provides teaching across a wide range of disciplines. This includes botany and zoology, hydrology and GIS and natural resource management.

Mweka Wildlife College. This college is located on the slopes of Mt Kilimanjaro near Moshi. It teaches students all aspects of wildlife and park management.

Olmotonyi forestry training institute. This college is located near Arusha and teaches students all aspects of forestry and forest management.

There are also a number of technical level institutions that undertake research on behalf of the government or other clients.

Within the forestry sector there is the *Tanzania Forestry Research Institute* (TAFORI). This has its base in Morogoro and there is a sub-station in Lushoto in the West Usambara Mountains. It undertakes targeted research on natural and plantation forests across Tanzania, including in the Eastern Arc Mountains. The *Tanzania National Tree Seed Centre* (TTSC) is also based in Morogoro and hosts a professional botanist and experts in the cultivation and storage of seeds from native and exotic tree species. It also holds seeds from the Eastern Arc Mountains.

Within the wildlife sector there is the *Tanzania Wildlife Research Institute*. This is located in Arusha and is undertakes targeted research in the field of wildlife conservation in Tanzania. It does not work in the Eastern Arc region.

5.h Visitor facilities and statistics

Visitor facilities. The Eastern Arc Mountains contain a number of hotels that are established for visiting tourists. Hotels dedicated to ecotourists are few in number and are found in the West Usambara (2), East Usambara (2), Uluguru (2) and Udzungwa (2). The total number of beds available in all these ecotourism locations is under 500 beds, so the total number of tourists can never be that large.

Visitor statistics. A detailed study in 2007 worked across the entire Eastern Arc Mountains and gathered information on the number of tourists visiting different mountain blocks. A summary of the information gathered by that study is presented below:

Number of people known to have visited Eastern Arc Mountain blocks in 2007

Mountain Block	Protected Area	Visitor Numbers (2007)	2009 Updates
North Pare	Various	23	
South Pare	Various	100	
West Usambara	Various	5,599	
East Usambara	Amani Nature Reserve	1,567	
Uluguru	Various	2,700	
Udzungwa	Udzungwa Mountains National Park	2,587	4,734
Total		**12,576**	

Number of people participating in cultural tourism programme meetings across the Eastern Arc Mountains.

Cultural Tourism Module	Visitor numbers in 2007
North Pare Mountains	91
South Pare Mountains	136
West Usambara Mountains	605
East Usambara Mountains	226
Uluguru Mountains	175
Total	**1,233**

Origin of the tourists visiting some of the key reserves across the Eastern Arc Mountains in 2007.

Origin	Visitors to Udzungwa Mountains National Park (%)	Visitors to West Usambara Mountains (%)	Visitors to Amani Nature Reserve (%)
Europe	82	73	52
America	11	16	11
Africa	2	9	26
Asia	4	2	11
Oceania	1	0	0
Total	**100**	**100**	**100**

5.i Policies and programmes related to the presentation and promotion of the property

The Eastern Arc World Heritage Site is promoted in a minor way within the Eastern Arc Mountains web site (www.easternarc.or.tz). This web site could be adapted to provide a much greater emphasis on the World Heritage Site, or could have its own dedicated web pages on the WH site.

The Amani Nature Reserve is also promoted activity through its web site. In the same way, the Udzungwa Mountains National Park is also promoted through its website and through the efforts of TANAPA. These web pages could also be adapted to promote the Eastern Arc World Heritage Site.

5.j Staffing levels (professional, technical, maintenance)

The number of staff managing the habitats across the Eastern Arc Mountains are outlined in the table below and are summarised in the graph. The graph shows that the number of staff in 2004 was under 100, whereas by 2009/10 it is predicted to increase to over 200. The hope is to increase to over 350 by 2010/11.

Figure 9 Increase of staffing from 2004/05 to 2010/11 within the nine core reserves of the proposed Eastern Arc Mountains Forests of Tanzania World Heritage Site

Table 9. Staffing of the nine sites within the proposed Eastern Arc Mountains Forests World Heritage Site, between 2008/09 and 2010/11

Protected Area	Financial Year	Total staff	Number of Permanent Staff										Temporary staff
			Headquarters/Office-based Staff						Field-based staff				Total no. person months
			Managers/ Conservator	Forest Officers	Technical	Administrative	Drivers	Other	Rangers/ Beats	Guards/	Drivers	Other	
Guidance on staff categories			Warden, Director		research, IT, GIS	Accoun,Secr,Off Att		Watchman/security		Tour guides		Cook,Rest H.Att	
Amani Nature Reserve	2008-2009	28	1	1	3	2	0	0	6	0	0	0	15
Amani Nature Reserve	2009-2010	30	1	1	5	2	0	0	6	0	0	0	15
Amani Nature Reserve	2010-2011	31	1	1	5	3	1	9	6	0	0	0	5
Nilo Nature Reserve	2008-2009	11	1	0	5	0	0	0	5	0	0	0	0
Nilo Nature Reserve	2009-2010	17	1	2	7	0	2	0	5	0	0	0	0
Nilo Nature Reserve	2010-2011	45	1	3	11	6	3	8	5	2	0	6	0
Mkingu proposed Nature Reserve	2008-2009	6	0	0	2	0	0	0	4	0	0	0	0
Mkingu proposed Nature Reserve	2009-2010	25	1	3	5	3	3	6	4	0	0	0	0
Mkingu proposed Nature Reserve	2010-2011	32	1	3	11	4	3	6	4	0	0	0	0
Chome proposed Nature Reserve	2008-2009	8	0	0	3	0	0	0	5	0	0	0	0
Chome proposed Nature Reserve	2009-2010	11	1	0	3	0	0	0	7	0	0	0	0
Chome proposed Nature Reserve	2010-2011	55	1	5	16	5	4	7	14	0	0	0	3
Kilombero Nature Reserve	2008-2009	10	1		5	0	0	0	4	0	0	0	0
Kilombero Nature Reserve	2009-2010	18	1	2	9	0	2	0	4	0	0	0	0
Kilombero Nature Reserve	2010-2011	98	1		39	14	15	7	22	0	0	0	0
Udzungwa Mountains National Park	2008-2009	1	1										
Udzungwa Mountains National Park	2009-2010												
Udzungwa Mountains National Park	2010-2011												
Uluguru Nature Reserve	2008-2009	7	1	1	1	0	0	0	4	0	0	0	0

Uluguru Nature Reserve	2009-2010	14	1	2	5	0	2	0	4	0	0	0	0
Uluguru Nature Reserve	2010-2011	36	1	3	16	8	0	2	4	2	0	0	0
Uzungwa Scarp proposed Nature Reserve	2008-2009	1											
Uzungwa Scarp proposed Nature Reserve	2009-2010												
Uzungwa Scarp proposed Nature Reserve	2010-2011												
Magamba proposed Nature Reserve	2008-2009	2	0		2	0	0						
Magamba proposed Nature Reserve	2009-2010	8	0		2	0	0	0	6	0	0	0	0
Magamba proposed Nature Reserve	2010-2011	33	1		11	3	2	2	14	0	0	0	0

6. Monitoring

6.a Key indicators for measuring state of conservation

The Eastern Arc Mountains have a number of monitoring schemes in place that can provide information on how well managed the property is.

Protected Area coverage

The national parks, nature reserves, national and local authority forest reserves, and village land forest reserves have been mapped in Tanzania. Digital versions of these maps have been compiled and have been made available within the World Database on Protected Areas (www.wdpa.org). Maintaining this database is a priority for UNEP-WCMC, and the Forestry and Beekeeping Division and TANAPA both provide data to this database.

Forest Area change

The Eastern Arc has been assessed in terms of its total forest area in 1955, 1975, 1990, 2000 and this is currently being updated to 2008. This remote sensing shows that of the total of 366,000 ha of forest remaining in 2000, about 0.9% has been lost (1,910 ha) between years 1990 and 2000 across Eastern Arc Mountains region. This is an annual rate of loss of around 0.1% per annum. Preliminary analysis suggests that loss has continued until the present day, but that the rates have slowed as reserve boundaries are reached.

Remote sensing of forest cover provides a useful tool to determine the importance of protected areas in retaining forest cover, and also pin point areas of encroachment into the reserves. Summary statics of the forest change in the Eastern Arc are below.

Forest area statistics within the different forest zones of the Eastern Arc Mountains across time (Forestry and Beekeeping Division 2005)

Zone	Historical	1955	1975	2000	Rate of change/ year	
					1955-75	1975-00
Lowland montane	3,580	624	361	286	-1.78	-0.95
Submontane	4,861	748	480	440	-1.55	-1.85
Montane	6,819	1954	1649	1559	-0.73	-0.27
Upper montane	2,734	1410	1309	1262	-0.35	-0.18

It is the intention of the Tanzanian Government that new funding, for example from REDD projects in Tanzania, would be used to make detailed updates of the forest area in the Eastern Arc Mountains over time. Re-assessments on a five year period are proposed within the Eastern Arc Conservation Strategy document.

Management Effectiveness. The Forestry and Beekeeping Division has undertaken a detailed assessment of the status of management of the reserves in the Eastern Arc, using the 'Management Effectiveness Tracking Tool' or METT. This tool was used in 150 Forest Reserves in the Eastern Arc Mountains in 2004/05 (FBD 2005a). A sample of these Forest Reserves (30) was reassessed in 2009 and results are being analysed. An average score of 34.4% was obtained in 2004/05, which implies that the sites are moderately managed, but with significant area for improved management with more funding, more staffing, better management plans, and better

implementation of the existing management plans. The METT tool has been adopted by the Forestry and Beekeeping Division for use as a monitoring method for its network of reserves and is being applied in other sites outside the Eastern Arc. A summary of the results from the METT assessment of 2004/05 is presented below:

Number of forest sites in each management effectiveness score class in the Eastern Arc Mountains of Tanzania*

Forest category	**METT Scores%**			
	Poor	Average	Good	Very good
	15-30	31-45	46-60	>60
Central Government Forest Reserve	18	60	6	
Local Authority Forest Reserve	4	13	1	
Proposed Forest Reserve	13	5		
Private forest		2	1	1
Village forest reserve		1	1	
TOTAL	35	81	9	1
Percentage	27.8	64.3	7.1	0.8

* note that no Nature Reserves or National Parks were assessed in 2004

METT has also been applied in the Udzungwa Mountains National Park on two separate occasions, with the assistance of the WWF Tanzania Programme Office. It has also been applied in the management plans for each of the new Nature Reserves.

Forest Condition assessment

The condition of the forest habitat has been assessed across 30 Forest Reserves within the Eastern Arc in the period 2004/05. A repeat of this forest condition assessment was undertaken in 2009, in a smaller sample of the reserves, and the results are being analysed. The method entails simply counting the number of cut trees and poles along a transect through the forest, and generates an idea of the human disturbance in the forest.

Levels of disturbance in terms of cut trees or poles across the reserves of the Eastern Arc Mountains (FBD 2005a)

Reserve	**TREES (above 20cm dbh)**	Total Area of Transects (ha)	Total no. sampled trees	Average old cut trees	Average new cut trees	**POLES (below 20 cm dbh)**	Total number of sampled poles	Average of old cut poles	Average of new cut poles
Mramba	Trees	3	1197	7	2	Poles	2362	31.7	5.7
Kiverenge	Trees	2.4	659	53	2.1	Poles	893	59	7.1
Chambogo	Trees	5.45	2476	81.7	5.9	Poles	3586	134.7	14.3
Vumari	Trees	2	937	118.5	1.5	Poles	1558	79.5	4.5
Mkusu	Trees	4.75	1813	47.6	4.2	Poles	2282	54.3	14.7
Mazumbai	Trees	1.3	885	0	0	Poles	1042	0	0
Bombo West	Trees	3.5	1596	135.4	4.3	Poles	1497	72.9	2
Ambangulu	Trees	0.8	315	7.5	3.8	Poles	633	71.3	2.5
Nilo	Trees	6.1	2579	26.6	2.5	Poles	1787	44.1	4.4

Mtai	Trees	3.2	1473	34	0.6	Poles	1927	40	2.5
Nguru North	Trees	11.9	3720	2.9	0.3	Poles	3484	2	1.1
Kilindi	Trees	5	2397	0.8	1.4	Poles	2764	1.8	0.4
Idewa	Trees	0.85	889	83.5	0	Poles	729	140	0.9
Ihang'ana	Trees	3.05	2285	91.5	10.2	Poles	2447	110.5	14.1
Kisinga Lugala	Trees	8.7	3741	11.7	0.8	Poles	3299	16.9	0.8
Kitonga	Trees	3.05	830	109.2	4.6	Poles	848	70.2	1
Mselezi	Trees	2.3	724	21.7	5.6	Poles	673	36.1	0
Nambinga	Trees	1.05	462	25.7	0	Poles	518	15.2	0
Iyondo	Trees	9.5	4149	10.8	0.3	Poles	5167	7.5	0.3
Ihanga	Trees	3.5	867	95.4	6.3	Poles	1258	108.9	6.6
Mangalisa	Trees	5.05	1029	17.2	1.2	Poles	796	29.1	0.2
Mafwomero	Trees	3.3	2497	28.2	0	Poles	2312	43.3	2.7
Ukwiva	Trees	9.7	3611	7.3	0.1	Poles	2543	3.1	0
Mamiwa-Kisara	Trees	3.9	2369	27.4	0	Poles	2302	40.3	0.5
Kanga	Trees	4.25	1182	39.3	1.9	Poles	854	24.9	0.5
Nguru South	Trees	9.55	1105	18.7	4.4	Poles	1443	24.7	3.1
	Total	**117.15**	**45,787.00**	**1,102.60**	**64.00**		**49,004.00**	**1,262.00**	**89.90**
	Mean per forest	4.51	1,761.04	42.41	2.46		1,884.77	48.54	3.46

Species

In terms of biodiversity 95 of the vertebrate species are globally threatened with extinction according to the IUCN Red List of 2009 (13 Critical, 40 Endangered and 42 Vulnerable). All but a couple of these species are Eastern Arc endemic or near-endemic species. Further details on the red list species can be found on www.redlist.org.

Population trends are only known for monkey populations in the Udzungwa Mountains National Park. The Sanje Mangabey has a population of 2,800-3,500 individuals; the Iringa red colobus has a population of 25,000-35,000 individuals, and the Kipunji monkey has a population of around 100 animals (with a further 1,100 in southern Mbeya) (Rovero et al., 2009). Monitoring and studying the primates in this park is planned to continue indefinitely.

A summary of the attributes that have been monitored in the Eastern Arc and are hoped to be monitored into the future are outlined below.

Indicator	**Periodicity**	**Location of Records**
Forest area change	5 years	FBD / SUA
Management effectiveness (METT)	5 years	FBD
Disturbance of habitat	5 years	FBD / SUA
Reserve gazettment records	Ongoing	FBD / UNEP-WCMC
River flow rates	Ongoing	River Basin Authorities
Rainfall	Ongoing	Tanzania Meteorological Agency
Monkeys in Udzungwa NP	Ongoing	Udzungwa National Park and various partners

6.b Administrative arrangements for monitoring property

The Forestry and Beekeeping Division and TANAPA plan to continue to collect data on the management effectiveness of their networks of reserves, using the METT tool on a periodic basis. They will also continue to collect data on the reserve network and changes in its status. This is institutionalised within the national forestry database (NAFOBEDA) of the FBD.

The assessment of changes in forest condition and forest area can only be undertaken when there is a specific source of project funding. FBD would then contract the Sokoine University of Agriculture GIS and Remote Sensing Laboratory, in Morogoro, Tanzania, to do that work.

Water flow and water quality in the rivers flowing from the Eastern Arc Mountains is monitored routinely by the River Basin Authorities in Tanzania (Pangani, Wami-Ruvu and Rufiji). These agencies are mandated to collect the relevant data by the central government and some funding is provided for that purpose.

Population trends of specific species of animals are being monitored as component parts of long term research projects. These will continue for as long as funding can be obtained.

6.c Results of previous reporting exercises

The following baseline reports have been produced that contain the information required to monitor changes in the Eastern Arc Mountains World Heritage Site.

FBD 2005a. *Hydrological Values*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2005b. *Education and Awareness*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2005c. *Biodiversity*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2005d. *Forest Area*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2005e. *Forest Condition*, Threats and Management Effectiveness. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2006b. *Monitoring*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2006c. *Protected Area Network*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2007b. *Fire Reduction*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

FBD 2007d. *Carbon*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

7. Documentation

Additional documentation included is as follows:

1) Species lists for each forest a) birds, b) mammals, c) amphibians, d) reptiles
2) Full list of all sites in the core area (including all relevant area and declaration details)
3) Full list of all sites in the buffer zone (including all relevant area and declaration details).

7.a Photographs, slides, image inventory and authorization table and other audiovisual materials

Id. No	Format (slide/ print/ video)	Caption	Date	Photographer	Copyright owner	Contact details of copyright owner (Name, address, tel/fax, and e-mail)	Non exclusive cession of rights
Chome Proposed Nature Reserve							
SP1	Digital	Logging	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
SP2	Digital	Pitsawying platform	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
SP3	Digital	Forest with fire damage	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
SP4	Digital	Forest with fire damage	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
SP5	Digital	*Callulina sp*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP6	Digital	*Leptopelis parkeri*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP7	Digital	*Leptopelis parkeri*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP8	Digital	*Impatiens sp.*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP9	Digital	Inside forest	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP10	Digital	*Rhampholeon viridis*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP11	Digital	*Rhampholeon viridis*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
SP12	Digital	*Rhampholeon viridis*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
Magamba proposed Nature Reserve							
MG1	Digital	*Bradypodion spinosum*	2002	Nike Doggart	Nike Doggart	ndoggart@tfcg.or.tz	Yes
MG2	Digital	Forest interior	2002	Nike Doggart	Nike Doggart	ndoggart@tfcg.or.tz	Yes
MG3	Digital	Forest view	2002	Nike Doggart	Nike Doggart	ndoggart@tfcg.or.tz	Yes
Nilo and Amani Nature Reserves							
EU1	Digital	Landscape	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU2	Digital	Derema corridor	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU3	Digital	Towards Nilo	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU4	Digital	Amani NR canopy	2007	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU5	Digital	Mtai	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU6	Digital	Amani fern	2007	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes

EU7	Digital	Amani fern	2007	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU8	Digital	Amani NR interior	2007	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU9	Digital	Amani NR and cardamon	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU10	Digital	Large tree	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU11	Digital	Amani rain	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU12	Digital	*Chameleo deremensis*	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU13	Digital	Moth	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU13A	Digital	*Kinyonga tenue*	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU13B	Digital	Treefrog	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU13C	Digital	*Leptopelis flavomaculatus*	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU14	Digital	Tea estate worker	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU15	Digital	Tea	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU16	Digital	Tea factory	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU17	Digital	Old Gerrman train station	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU18	Digital	Amani sign	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU19	Digital	Amani NR HQ	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU20	Digital	Fish pond	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU21	Digital	Butterfly farming	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU22	Digital	Butterfly farming	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU23	Digital	Fire in Mtai	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU24	Digital	Farm in forest	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU25	Digital	Gold mining in stream	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU25	Digital	Gold mining in swamp	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
EU27	Digital	*Precis octavia*	2007	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
Mkingu proposed Nature Reserve							
NG1	Digital	Aerial photo of Mkingu	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG2	Digital	Aerial photo of Mkingu	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG3	Digital	Aerial photo of Mkingu	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG4	Digital	Aerial photo of Mkingu	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG5	Digital	Forest interior Kanga	2007	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG6	Digital	Forest interior Kanga	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG7	Digital	Forest interior Kanga	2007	Andrew Perkin	Andrew Perkin	bwanakomba@yahoo.com	Yes
NG8	Digital	*Chameleo deremensis*	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG9	Digital	*Chameleo dilepis*	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
NG10	Digital	*Hoplophryne sp.*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG11	Digital	*Callulina sp. 1*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG12	Digital	*Nectophrynoides sp. 1*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG13	Digital	Forest interior Mkingu	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG14	Digital	*Saintpaulia sp.*	2006	Andrew Perkin	Andrew Perkin	bwanakomba@yahoo.com	yes
NG15	Digital	*Leptopelis vermiculatus*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	yes
NG16	Digital	*Chamaeleo deremensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG17	Digital	View of Mkingu Nature Reserve	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG18	Digital	*Philothamnus punctatus*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG19	Digital	*Callulina sp. 2*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
NG20	Digital	*Boulengerula uluguruensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes

NG21	Digital	*Xyeledontophis uluguruensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
Uluguru Nature Reserve							
ULU1	Digital	Farmland Uluguru South	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU2	Digital	Farmland Uluguru South	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU3	Digital	Farmland Uluguru South	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU4	Digital	Farmland Uluguru South	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU5	Digital	Forest edge/boundary	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU6	Digital	Forest edge/boundary	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU7	Digital	Forest edge/boundary	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU8	Digital	Forest edge/boundary	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU9	Digital	Forest edge/boundary	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU10	Digital	Forest interior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU11	Digital	Forest interior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU12	Digital	Forest interior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU13	Digital	Forest interior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU14	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU15	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU16	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU17	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU18	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU19	Digital	Lukwangule Plateau	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU20	Digital	Waterfall	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU21	Digital	Waterfall	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU22	Digital	Loveridges sunbird	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU23	Digital	Blue duiker	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU24	Digital	*Chameleo fisheri*	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU25	Digital	Mrs Moreau sunbird	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU26	Digital	*Leptopelis uluguruensis*	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU27	Digital	Pitsawn timber	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU28	Digital	Market	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU29	Digital	Nursery	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU30	Digital	Church exterior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU31	Digital	Church interior	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
ULU32	Digital	*Afrixalus uluguruensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
ULU33	Digital	*Leptopelis uluguruensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
Kilombero Nature Reserve				Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
KILO1	Digital	*Galagoides orinus*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
KILO2	Digital	*Rhynchocyon uzungwensis*	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
KILO3	Digital	Forest interior	2006	Dr Francesco Rovero	Dr Francesco Rovero	francesco_rovero@yahoo.it	Yes
KILO4	Digital	Forest view	2006	Dr Francesco Rovero	Dr Francesco Rovero	francesco_rovero@yahoo.it	Yes
Udzungwa National Park							
UMN1	Digital	Iringa red colobus	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN2	Digital	View of Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN3	Digital	View of Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes

UMN4	Digital	View of Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN5	Digital	View of Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN6	Digital	Eastern double-collared sunbird	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN7	Digital	Elephant in Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN8	Digital	Forest interior Udzungwa Mountains National Park	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN9	Digital	Sanje mangabey	2006	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UMN10	Digital	*Urocotyledon rasmusseni*	2006	Michele Menegon	Michele Menegon		Yes
Uzungwa Scarp proposed Nature Reserve							
UDZ1	Digital	Forest with clouds	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ2	Digital	Forest with clouds	2005	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ3	Digital	Kihansi gorge waterfalls	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ4	Digital	Kihansi gorge waterfalls	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ5	Digital	Small waterfall	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ6	Digital	Forest interior	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ7	Digital	*Impatiens and Amaryllis*	2006	Dr Neil Burgess	Dr Neil Burgess	Neil.burgess@wwfus.org	Yes
UDZ8	Digital	*Afrixalus sp.*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ9	Digital	*Chamaeleo laterispinis*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ10	Digital	*Chamaeleo tempeli*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ11	Digital	Forest view	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ12	Digital	*Epomophorus wahlbergi*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ13	Digital	*Kinyongia oxyrhina*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ14	Digital	*Leptopelis barbouri*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ15	Digital	*Lycophidion uzungwensis*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
UDZ16	Digital	*Chamaeleo laterispinis*	2008	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
Video							
DVD The Arc	Digital	The Arc (x3)	2005	Michele Menegon	Michele Menegon	mmenegon@gmail.com	Yes
DVD Lulanda	Digital	Lulanda: a village and its forest (x2)	2002	Nike Doggart	TFCG	tfcg@tfcg.or.tz	Yes
DVD Cry of the Forest	Digital	Cry of the Forest (x3)	2009	Lars Johansson	TFCG	tfcg@tfcg.or.tz	Yes
DVD Villages	Digital	Villages on the Frontline - Tanzania (x3)	2008	Robert Lamb	TFCG	tfcg@tfcg.or.tz	Yes

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the property

Copy of the Forest Act no 14 of 2001

Copy of the Wildlife Act of 2009

Copy of the text of the National Forest Policy of 1998

Copy of the National Forest Programme of 2002

Copy of Property Management Plan for the Eastern Arc "Eastern Arc Mountains Conservation Strategy document" – Forestry and Beekeeping Division 2009

Gazettment notices for Amani, Nilo, Uluguru and Kilombero Nature Reserves

Gazettment notices for Udzungwa Mountains National Park

7.c Form and date of most recent records or inventory of property

Site	Biodiversity inventory	Forest areas	Forest condition	Management effectiveness
Chome proposed NR	No recent inventory of animals. For plants see 1	2	3	3
Magamba proposed NR	No recent inventory of animals or plants	2	3	3
Amani Nature Reserve	4	2	3	3
Nilo Nature Reserve	5	2	3	3
Uluguru Nature Reserve	6	2	3	3
Mkingu proposed Nature reserve	7,8	2	3	3
Kilombero Nature Reserve	9	2	3	3
Udzungwa Mountains National Park	No complete inventory available, but see 11	2	10	11
Uzungwa Scarp proposed Nature Reserve	No complete inventory available, but see 12	2	3	3

1 = UNDP-GEF Cross Borders Project Botanical Survey Reports from TAFORI (see www.easternarc.or.tz/South Pare)

2 = FBD 2005. *Forest Area in the Eastern Arc Mountains*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

3 = FBD 2005a. *Forest Condition, Threats and Management Effectiveness across the Eastern Arc Mountains*. Forestry and Beekeeping Division, Ministry of Natural Resources and Tourism, Dar es Salaam. www.easternarc.or.tz

4 = Frontier-Tanzania 2001. Amani Nature Reserve Biodiversity Survey Report. East Usambara Catchment Forest Programme; Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division. See www.easternarc.or.tz

5 = Frontier-Tanzania 2002. Nilo Biodiversity Survey Report. East Usambara Catchment Forest Programme; Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division. See www.easternarc.or.tz

6 = Frontier-Tanzania 2005. Uluguru component biodiversity survey: Uluguru South and Uluguru North Forest Reserves. Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division. See www.easternarc.or.tz

7 = Frontier-Tanzania 2007. Nguru South and Kanga Forest Reserves Biodiversity Survey. Frontier Tanzania; Society for Environmental Exploration and University of Dar es Salaam. See www.easternarc.or.tz

8 = Tanzania Forest Conservation Group 2007. Nguru South Forest Reserve Biodiversity Survey. Tanzanian Forest Conservation Group, Dar es Salaam. See www.easternarc.or.tz

9 = Frontier Tanzania 2001. West Kilombero Scarp Forest Reserve Biodiversity Survey Report. Ministry of Natural Resources and Tourism, Forestry and Beekeeping Division. See www.easternarc.or.tz

10 = Udzungwa Mountains National Park 2006. Report on Fuel Wood collection and use in the Park. Tanzania National Parks, Ministry of Natural Resources and Tourism.

11 = TANAPA 2001. Management Plan for Udzungwa Mountains National Park. Tanzania National Parks, Ministry of Natural Resources and Tourism

12 = Rovero, F., Marshall, A., Jones, T. And Perkins, A. (2009). Primates of Udzungwa Mountains: diversity, ecology and conservation. Journal of Anthropological Science 87: 93-126.

7.d Address where inventory, records and archives are held

Biodiversity inventory reports. C/o Professor Kim Howell, Department of Zoology and Marine Biology, University of Dar es Salaam, Tanzania. Data in form of reports and UDSM biodiversity database. Reports also available on www.easternar.or.tz

Forest Area data. C/o Professor Boniface Mbilinyi, Remote Sensing and GIS Laboratory, Sokoine University of Agriculture, Morogoro, Tanzania. Report and GIS data also available on www.easternarc.or.tz

Forest condition data. C/o Professors Seif Madoffe and Panteleo Munishi, Department of Forestry and Nature Conservation, Sokoine University of Agriculture, Morogoro. Report and summary data also available on www.easternarc.or.tz

Management effectiveness data. C/o Professors Seif Madoffe and Panteleo Munishi, Department of Forestry and Nature Conservation, Sokoine University of Agriculture, Morogoro. Report and summary data also available on www.easternarc.or.tz

Summary data also available within the database of the Forestry and Beekeeping Division (NAFOBEDA) located at the headquarters in Dar es Salaam.

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Nature Reserve Unit, Eastern Arc Mountains Conservation Centre - Morogoro
Amani Nature Reserve, Amani - East Usambara
Uluguru Nature Reserve management authority – Morogoro (Ulugurus)
Nilo Nature Reserve management unit – Amani (East Usambaras)
Kilombero Nature Reserve management unit – Iringa (Udzungwas)
Iringa Regional Catchment office - Iringa
Morogoro Regional Catchment office - Morogoro
Tanga Regional Catchment office - Tanga
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8.d Official Web address

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http://www.easternarc.or.tz
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http://www.udzungwa.org

9. Signature on behalf of the State Party

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Donatius Kamamba
Director of Division of Antiquities
Ministry of Natural Resources and Tourism

Date……

ANNEX 1. EASTERN ARC MOUNTAINS: ENDEMIC PLANTS (KENYA AND TANZANIA)

Family	Genus	species	infraspecies	Author(s)	Single Bloc	Single Site
Acanthaceae	Dicliptera	grandiflora		Gilli	Uluguru	Uluguru NR
Acanthaceae	Isoglossa	imbricata		Brummitt	Udzungwa	Udzungwa Mts. NP
Acanthaceae	Justicia	beloperonoides		Lindau	Udzungwa	Udzungwa Mts. NP
Acanthaceae	Justicia	diclipteroides	subsp. usambarica	Hedrén	W Usambara	Chambogo (B) FR
Acanthaceae	Justicia	oblongifolia		(Lindau) M.E. Steiner	E Usambara	Amani NR
Acanthaceae	Justicia	palustris		(Hochst.) T. Anderson	E Usambara	Nilo NR
Ancistrocladaceae	Ancistrocladus	tanzaniensis		Cheek & Frim.	Udzungwa	Uzungwa Scarp NR
Annonaceae	Toussaintia	patriciae		Q. Luke & Deroin	Udzungwa	Udzungwa Mts. NP
Aquifoliaceae	Ilex	mitis	var. schliebenii	Loes.	Uluguru	Uluguru NR
Asteraceae	Blepharispermum	canescens		T. Erikss.	Udzungwa	Udzungwa Mts. NP
Asteraceae	Bothriocline	shagayuensis		C. Jeffrey	W Usambara	Shagayu FR
Asteraceae	Ethulia	greenwayi		M.G. Gilbert	W Usambara	Mkusu FR
Asteraceae	Senecio	dentatoalatus		Mildbr. ex C. Jeffrey	Uluguru	Uluguru NR
Asteraceae	Senecio	subfractiflexus		C. Jeffrey	Uluguru	Uluguru NR
Asteraceae	Sphaeranthus	cristatus		O. Hoffm.	W Usambara	Baga II FR
Asteraceae	Vernonia	luhomeroensis		Q. Luke & Beentje	Udzungwa	Udzungwa Mts. NP
Asteraceae	Vernonia	tricholoba		C. Jeffrey	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	barbulata		G.M. Schulze	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	eryaleia	subsp. gigantea	Grey-Wilson	Udzungwa	Lulanda FR
Balsaminaceae	Impatiens	humifusa		G.M. Schulze	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	messumbaensis		G.M. Schulze	Nguru	Mkingu NR
Balsaminaceae	Impatiens	messumbaensis	subsp. fimbrisepala	Grey-Wilson	Nguru	Mkingu NR
Balsaminaceae	Impatiens	messumbaensis	subsp. messumbaensis		Nguru	Mkingu NR
Balsaminaceae	Impatiens	palliderosea	var. palliderosea		Uluguru	Uluguru NR
Balsaminaceae	Impatiens	pseudohamata		Grey-Wilson	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	saliensis		G.M. Schulze	Mahenge	Sali FR
Balsaminaceae	Impatiens	serpens		Grey-Wilson	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	simbiniensis		Grey-Wilson	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	thamnoidea		G.M. Schulze	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	tricaudata		G.M. Schulze	Uluguru	Uluguru NR
Balsaminaceae	Impatiens	ukagurensis		Grey-Wilson	Ukaguru	Mamiwa Kisara FR
Balsaminaceae	Impatiens	uzungwaensis		Grey-Wilson & Frim	Udzungwa	Uzungwa Scarp NR
Begoniaceae	Begonia	schliebenii		Irmsch.	Uluguru	Uluguru NR
Begoniaceae	Begonia	zimmermannii		Peter ex Irmsch.	E Usambara	Amani NR
Burmanniaceae	Afrothismia	insignis		Cowley	Udzungwa	Kigogo FR
Burmanniaceae	Afrothismia	mhoroana		Cheek	Uluguru	Mkungwe FR
Campanulaceae	Lobelia	graniticola		E. Wimm.	Uluguru	Uluguru NR
Campanulaceae	Lobelia	lukwangulensis		Engl.	Uluguru	Uluguru NR
Campanulaceae	Lobelia	ritabeaniana		E.B. Knox	Nguru	Mkingu NR
Campanulaceae	Lobelia	sancta		Thulin	Ukaguru	North Mamiwa Kisara FR
Campanulaceae	Lobelia	udzungwensis		Thulin	Udzungwa	Udzungwa Mts. NP
Celastraceae	Maytenus	nguruensis		N. Robson & Sebsebe	Nguru	Mkingu NR
Celastraceae	Salacia	lovettii		N. Hallé & B.Mathew	Udzungwa	Udzungwa Mts. NP
Cycadaceae	Encephalartos	sclavoi		De Luca & D.W. Stev. & A. Moretti	W Usambara	Shume-Magamba FR
Cyperaceae	Cyperus	graciliculmis		Lye	Ukaguru	North Mamiwa Kisara FR
Ebenaceae	Diospyros	uzungwaensis		Frim. & Ndang.	Udzungwa	Uzungwa Scarp NR
Euphorbiaceae	Drypetes	usambarica	var. rugulosa	Radcl.-Sm.	Udzungwa	Lulanda FR

Family	Genus	species	infraspecies	Author(s)	Single Bloc	Single Site
Euphorbiaceae	Erythrococca	sanjensis		Radcl.-Sm.	Udzungwa	Udzungwa Mts. NP
Euphorbiaceae	Euphorbia	classenii		P.R.O. Bally & S. Carter	Taita	Kasigau FR
Euphorbiaceae	Meineckia	nguruensis		(Radcl.-Sm.) Brunel ex Radcl.-Sm.	Nguru	Mkingu NR
Euphorbiaceae	Meineckia	uzungwaensis		(Radcl.-Sm.) Radcl.-Sm.	Udzungwa	Lulanda FR
Euphorbiaceae	Phyllanthus	rhizomatosus		Radcl.-Sm.	Nguru	Nguru South FR
Euphorbiaceae	Phyllanthus	thulinii		Radcl.-Sm.	Uluguru	Uluguru NR
Fabaceae	Cynometra	longipedicellata		Harms	E Usambara	Amani NR
Fabaceae	Cynometra	ulugurensis		Harms	Uluguru	Kimboza FR
Fabaceae	Englerodendron	usambarense		Harms	E Usambara	Amani NR
Fabaceae	Zenkerella	perplexa		Temu	Uluguru	Uluguru NR
Gesneriaceae	Saintpaulia	goetzeana		Engl.	Uluguru	Uluguru NR
Gesneriaceae	Saintpaulia	inconspicua		B.L. Burtt	Uluguru	Uluguru NR
Gesneriaceae	Saintpaulia	ionantha	subsp. mafiensis	I. Darbysh. & Pócs	W Usambara	Mafi Hill FR
Gesneriaceae	Saintpaulia	ionantha	subsp. occidentalis	(B.L. Burtt) I. Darbysh.	W Usambara	Shagayu FR
Gesneriaceae	Saintpaulia	ulugurensis		Haston	Uluguru	Uluguru NR
Gesneriaceae	Saintpaulia	watkinsii		Haston	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	albus	subsp. edwardsii	(Weigend) I. Darbysh.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	bullatus		Mansf.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	euanthus		Mansf.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	heckmannianus		(Engl.) I. Darbysh.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	heckmannianus	subsp. gracilis	(E.A. Bruce) I. Darbysh.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	heckmannianus	subsp. heckmannianus		Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	parensis		B.L. Burtt	S Pare	Chome NR
Gesneriaceae	Streptocarpus	subscandens		(B.L. Burtt) I. Darbysh.	Uluguru	Uluguru NR
Gesneriaceae	Streptocarpus	thysanotus		Hilliard & B.L. Burtt	Uluguru	Mkungwe FR
Gesneriaceae	Streptocarpus	kimbozanus		B.L. Burtt	Uluguru	Kimboza FR
Lamiaceae	Plectranthus	dichotomus		A.J. Paton	Ukaguru	North Mamiwa Kisara FR
Lamiaceae	Plectranthus	strangulatus		A.J. Paton	Uluguru	Uluguru NR
Malpighiaceae	Acridocarpus	congestus		Launert	Uluguru	Uluguru NR
Melastomataceae	Dionychastrum	schliebenii		A. & R. Fern.	Uluguru	Uluguru NR
Melastomataceae	Gravesia	hylophila		(Gilg) A. & R. Fern.	Uluguru	Uluguru NR
Melastomataceae	Warneckea	erubescens		(Gilg) Jacq.-Fél.	E Usambara	Amani NR
Melastomataceae	Warneckea	microphylla		(Gilg) Borhidi	E Usambara	Amani NR
Meliaceae	Turraea	mombassana	subsp. schliebenii	(Harms) Styles & F. White	Uluguru	Uluguru NR
Moraceae	Dorstenia	bicaudata		Peter	E Usambara	Amani NR
Moraceae	Dorstenia	ulugurensis		Engl.	Uluguru	Uluguru NR
Oleaceae	Jasminum	angustitubum		Knobl.	Mahenge	Mahenge Scarp FR
Oleaceae	Jasminum	rotundatum		Knobl.	Uluguru	Uluguru NR
Orchidaceae	Ancistrorhynchus	parviflorus		Summerh.	E Usambara	Amani NR
Orchidaceae	Angraecopsis	lovettii		P.J. Cribb	Udzungwa	Image FR
Orchidaceae	Bulbophyllum	gilgianum		Kraenzl.	Uluguru	Uluguru NR
Orchidaceae	Cynorkis	usambarae		Rolfe	E Usambara	Mtai FR
Orchidaceae	Diaphananthe	orientalis		(Mansf.) F.N. Rasm.	Uluguru	Uluguru NR
Orchidaceae	Disperis	egregia		Summerh.	E Usambara	Amani NR
Orchidaceae	Disperis	elaphoceras		Verdc.	Udzungwa	Udzungwa Mts. NP
Orchidaceae	Mystacidium	nguruense		P.J. Cribb	Nguru	Mkingu NR
Orchidaceae	Polystachya	canaliculata		Summerh.	Nguru	Mkingu NR
Orchidaceae	Polystachya	longiscapa		Summerh.	Uluguru	Uluguru NR
Orchidaceae	Polystachya	lukwangulensis		P.J. Cribb	Uluguru	Uluguru NR
Orchidaceae	Polystachya	melliodora		P.J. Cribb	Udzungwa	Udzungwa Mts. NP
Orchidaceae	Polystachya	porphyrochila		J.L. Stewart	Uluguru	Uluguru NR
Orchidaceae	Polystachya	rugosilabia		Summerh.	Nguru	Mkingu NR
Orchidaceae	Stolzia	angustifolia		Mansf.	Uluguru	Uluguru NR

Family	Genus	species	infraspecies	Author(s)	Single Bloc	Single Site
Orchidaceae	Stolzia	atrorubra		Mansf.	Uluguru	Uluguru NR
Orchidaceae	Stolzia	moniliformis		P.J. Cribb	Uluguru	Uluguru NR
Orchidaceae	Stolzia	oligantha		Mansf.	Uluguru	Uluguru NR
Orchidaceae	Stolzia	viridis		P.J. Cribb	Uluguru	Uluguru NR
Orchidaceae	Tridactyle	flabellata		P.J. Cribb	Udzungwa	Udzungwa Mts. NP
Orchidaceae	Tridactyle	minuta		P.J. Cribb	Udzungwa	Udzungwa Mts. NP
Orchidaceae	Tridactyle	phaeocephala		Summerh.	Uluguru	Uluguru NR
Orchidaceae	Tridactyle	sarcodantha		Mansf.	Uluguru	Uluguru NR
Piperaceae	Peperomia	molleri	subsp. ukagurensis	Verdc.	Ukaguru	Mamiwa Kisara FR
Pittosporaceae	Pittosporum	goetzei		Engl.	Uluguru	Uluguru NR
Poaceae	Hickelia	africana		S. Dransf.	Udzungwa	Mufindi Scarp East FR
Pteridophyta	Blotiella	coriacea		Verdc.	Uluguru	Uluguru NR
Pteridophyta	Diplazium	ulugurense		Verdc.	Uluguru	Uluguru NR
Pteridophyta	Lellingeria	rupestris		Parris	Nguru	Mkingu NR
Pteridophyta	Pteris	mkomaziensis		Verdc.	S Pare	Mkomazi GR
Rubiaceae	Chassalia	bonifacei		Thulin & S. Manktelow	Nguru	Mkingu NR
Rubiaceae	Chassalia	christineae		Thulin & S. Manktelow	Nguru	Mkingu NR
Rubiaceae	Chassalia	lukwangulensis		Thulin	Uluguru	Uluguru NR
Rubiaceae	Chassalia	violacea		K. Schum.	Uluguru	Uluguru NR
Rubiaceae	Chassalia	violacea	var. parviflora	Verdc.	Uluguru	Uluguru NR
Rubiaceae	Chassalia	violacea	var. violacea		Uluguru	Uluguru NR
Rubiaceae	Coffea	kihansiensis		A.P. Davis & Mvungi	Udzungwa	Uzungwa Scarp NR
Rubiaceae	Coffea	lulandoensis		Bridson	Udzungwa	Lulanda FR
Rubiaceae	Lasianthus	macrocalyx		K. Schum	Uluguru	Uluguru NR
Rubiaceae	Lasianthus	wallacei		E.A. Bruce	Uluguru	Uluguru NR
Rubiaceae	Oxyanthus	lepidus	subsp. kigogoensis	Bridson	Udzungwa	Kigogo FR
Rubiaceae	Pavetta	abyssinica	subsp. viridiflora	Bridson	Nguru	Mkingu NR
Rubiaceae	Pavetta	bruceana		Bremek.	Uluguru	Uluguru NR
Rubiaceae	Pavetta	constipulata		Bremek.	Uluguru	Uluguru NR
Rubiaceae	Pavetta	constipulata	var. constipulata		Uluguru	Uluguru NR
Rubiaceae	Pavetta	constipulata	var. uranoscopa	Bremek.	Uluguru	Uluguru NR
Rubiaceae	Pavetta	delicatifolia		Bridson	Udzungwa	Kitemele FR
Rubiaceae	Pavetta	filistipulata		Bremek.	Uluguru	Uluguru NR
Rubiaceae	Pavetta	lulandoensis		Bridson	Udzungwa	Lulanda FR
Rubiaceae	Pavetta	roseostellata		Bridson	Udzungwa	Kilombero NR
Rubiaceae	Pentas	hindsioides	var. parensis	Verdc.	S Pare	Chome NR
Rubiaceae	Psychotria	cephalidantha		K. Schum.	Uluguru	Uluguru NR
Rubiaceae	Psychotria	hemsleyi		Verdc.	W Usambara	Shagayu FR
Rubiaceae	Psychotria	pocsii	subsp. pocsii		E Usambara	Amani NR
Rubiaceae	Psychotria	pocsii	subsp. ferruginea	Borhidi & Verdc.	Nguru	Mkingu NR
Rubiaceae	Psychotria	scheffleri		K. Schum. & K. Krause	E Usambara	Amani NR
Rubiaceae	Psychotria	taitensis		Verdc.	Taita	Kasigau FR
Rubiaceae	Pyrostria	uzungwaensis		Bridson	Udzungwa	Udzungwa Mts. NP
Rubiaceae	Rhipidantha	chlorantha		(K. Schum.) Bremek.	Uluguru	Uluguru NR
Rubiaceae	Rytigynia	dichasialis		Lantz & Gereau	E Usambara	Amani NR
Rubiaceae	Rytigynia	griseovelutina		Verdc.	Mahenge	Sali FR
Rubiaceae	Rytigynia	lichenoxenos	subsp. lichenoxenos		Uluguru	Uluguru NR
Rubiaceae	Rytigynia	longituba		Verdc.	Nguru	Mkingu NR
Rubiaceae	Rytigynia	nodulosa		(K. Schum.) Robyns	Uluguru	Uluguru NR
Rubiaceae	Rytigynia	saliensis		Verdc.	Mahenge	Muhulu FR
Rubiaceae	Rytigynia	xanthotricha		(K. Schum.) Verdc.	E Usambara	Amani NR
Rubiaceae	Tarenna	quadrangularis		Bremek.	Uluguru	Uluguru NR
Rubiaceae	Tarenna	uzungwaensis		Bridson	Udzungwa	Udzungwa Mts. NP

Family	Genus	species	infraspecies	Author(s)	Single Bloc	Single Site
Rubiaceae	Vangueriopsis	longiflora		Verdc.	Udzungwa	Udzungwa Mts. NP
Rutaceae	Vepris	ngamensis		I. Verd.	E Usambara	Amani NR
Sapindaceae	Allophylus	delicatulus		Verdc.	Mahenge	Sali FR
Sapindaceae	Chytranthus	longibracteatus		F.G. Davies	Nguru	Mkingu NR
Sapindaceae	Placodiscus	pedicellatus		F.G. Davies	Udzungwa	Udzungwa Mts. NP
Sapotaceae	Neohemsleya	usambarensis		T.D. Penn.	W Usambara	Shagayu FR
Sterculiaceae	Cola	usambarensis		Engl.	E Usambara	Amani NR
Theaceae	Balthasaria	schliebenii	var. schliebenii		Uluguru	Uluguru NR
Thymelaeaceae	Peddiea	lanceolata		Domke	Mahenge	Sali FR
Triuridaceae	Kihansia	lovettii		Cheek	Udzungwa	Uzungwa Scarp NR
Triuridaceae	Kupea	jonii		Cheek	Udzungwa	Uzungwa Scarp NR
Triuridaceae	Seychellaria	africana		Vollesen	Udzungwa	Udzungwa Mts. NP
Turneraceae	Stapfiella	ulugurica		Mildbr.	Uluguru	Uluguru NR
Viscaceae	Viscum	luisengense		Polhill & Wiens	Udzungwa	Mufindi Scarp East FR
Vitaceae	Cyphostemma	masukuense	subsp. nguruense	Verdc.	Nguru	Mkingu NR
Vitaceae	Cyphostemma	muhuluense		(Mildbr.) Desc.	Mahenge	Muhulu FR
Vitaceae	Cyphostemma	njegerre		(Gilg & H.C. Strauss) Desc.	E Usambara	Amani NR

ANNEX 2. EASTERN ARC MOUNTAINS: ENDEMIC AND NEAR-ENDEMIC VERTEBRATES

Taxa	Species	Endemism	Threat (Red List 2009)	Taita	N. Pare	S. Pare	W. Usambara	E. Usambara	Nguu	Nguru	Ukaguru	Uluguru	Rubeho	Malundwe	Udzungwa	Mahenge	Number of blocks
Mammals	*Bdeogale jacksoni*	NE	NT	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Beamys hindei	NE	LC	0	0	1	1	1	0	1	1	1	1	1	1	1	**10**
	Cephalophus harveyi	NE	LC	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Cephalophus spadix	NE	EN	0	0	0	1	1	0	0	0	1	1	0	1	0	**5**
	Cercocebus sanjei	E	EN	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Congosorex phillipsorum	E	CR	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Crocidura desperata	NE	EN	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Crocidura monax	NE	LC	0	0	0	1	0	0	1	0	1	1	0	1	0	**5**
	Crocidura tansaniana	E	EN	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Crocidura telfordi	E	EN	0	0	0	0	0	0	0	0	1	0	0	1	0	**2**
	Crocidura usambarae	E	EN	0	0	1	1	0	0	0	0	0	0	0	0	0	**2**
	Dendrohyrax validus	NE	LC	0	1	1	1	1	1	1	0	1	1	0	1	1	**10**
	Galagoides orinus	NE	NT	0	0	0	1	1	0	1	0	1	1	0	1	1	**7**
	Galagoides zanzibaricus udzungwensis	E	LC	0	0	0	0	1	0	1	0	0	0	0	1	0	**3**
	Galagoides zanzibaricus zanzibaricus	NE	LC	0	0	0	0	1	1	0	0	1	0	0	1	0	**4**
	Hylomyscus arcimontensis	E	NE	0	1	1	1	1	1	1	1	1	1	0	1	1	**11**
	Lophocebus kipunji	NE	CR	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Loxodonta africana	No	NT	0	0	0	0	0	0	1	1	0	1	1	1	1	**6**
	Lycaon pictus	No	EN	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Myonycteris relicta	NE	VU	0	0	0	0	1	0	0	0	1	0	0	1	1	**4**
	Myosorex geata	E	EN	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Myosorex kihaulei	E	EN	0	0	0	0	0	0	0	0	0	1	0	1	0	**2**
	Otomops martiensseni	No	NT	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Otomys uzungwensis	NE	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Panthera leo	No	VU	0	0	0	0	0	0	0	0	1	0	0	1	1	**3**
	Paraxerus lucifer	NE	VU	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Paraxerus vexillarius	NE	NT	0	0	0	1	0	0	1	0	0	0	0	0	1	**3**
	Praomys delectorum	No	NT	0	0	1	1	1	0	1	1	1	1	1	1	1	**10**
	Piliocolobus gordonorum	E	EN	0	0	0	0	1	0	0	0	0	0	0	1	0	**2**
	Rhinolophus deckenii	NE	NT	0	1	0	0	1	0	0	0	0	0	1	1	0	**4**
	Rhinolophus maendeleo	NE	DD	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Rhynchocyon cirnei	No	NT	0	0	0	0	0	0	0	0	0	1	0	1	1	**3**
	Rhynchocyon petersi	NE	VU	0	1	1	1	1	1	1	0	1	0	0	1	1	**9**
	Rhynchocyon udzungwensis	E	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Sylvisorex howelli	E	EN	0	0	0	1	1	1	1	1	1	1	0	0	0	**7**
Reptiles	*Adenorhinos barbouri*	NE	DD	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Agama montana	E	NE	0	0	0	0	1	0	1	0	1	0	0	0	0	**3**
	Amblyodipsas teitana	E	NE	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Aparallactus werneri	NE	VU	0	0	0	0	1	0	1	0	1	0	0	0	0	**3**
	Atheris ceratophora	E	NE	0	0	0	1	1	0	1	0	1	0	0	1	0	**5**
	Buhoma procterae	E	NE	0	0	0	0	0	0	0	0	1	1	0	1	0	**3**
	Buhoma vauerocegae	E	NE	0	0	0	0	1	0	1	0	1	0	0	0	0	**3**
	Chamaeleo deremensis	E	VU	0	0	0	1	1	0	1	0	1	0	0	0	0	**4**
	Chamaeleo goetzei	NE	NE	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Chamaeleo laterispinis	E	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Chamaeleo tempeli	NE	NE	0	0	0	0	1	1	0	0	0	0	0	1	0	**3**
	Chamaeleo werneri	E	VU	0	0	0	0	1	0	1	1	1	1	0	1	0	**6**
	Cnemaspis barbouri	NE	NE	0	0	0	0	1	0	0	0	1	0	0	0	0	**2**

Taxa	Species	Endemism	Threat (Red List 2009)	Taita	N. Pare	S. Pare	W. Usambara	E. Usambara	Nguu	Nguru	Ukaguru	Uluguru	Rubeho	Malundwe	Udzungwa	Mahenge	Number of blocks
	Cnemaspis uzungwae	NE	VU	0	0	0	0	0	0	0	0	0	0	0	1	1	**2**
	Crotaphopeltis tornieri	NE	NE	0	0	0	1	1	0	1	1	1	1	0	1	1	**8**
	Dipsadoboa werneri	E	VU	0	0	0	0	0	0	1	0	0	0	0	1	0	**2**
	Elapsoidea nigra	E	NE	0	0	0	0	1	0	1	0	1	0	0	0	0	**3**
	Gastropholis prasina	NE	NE	0	0	0	0	1	0	1	0	0	0	0	0	0	**2**
	Kinyongia fischeri	E	NE	0	0	0	0	1	0	1	0	0	0	0	0	0	**2**
	Kinyongia magomberae	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Kinyongia oxyrhina	E	VU	0	0	0	0	0	1	1	0	1	1	0	1	0	**5**
	Kinyongia tenue	NE	NE	0	0	0	0	1	0	0	0	0	0	0	1	0	**2**
	Leptosiaphos rhomboidalis	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Lycophidion uzungwense	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Lygodactylus conradti	NE	NE	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Lygodactylus gravis	NE	NE	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
	Lygodactylus uluguruensis	NE	EN	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Lygodactylus williamsi	E	NE	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Melanoseps uzungwensis	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Philothamnus macrops	NE	NE	0	0	0	0	1	1	1	0	1	0	0	1	0	**5**
	Prosymna ornatissima	E	CR	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Prosymna semifasciata	NE	EN	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Rhampholeon acuminatus	E	NE	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Rhampholeon beraduccii	E	NE	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
	Rhampholeon spinosus	E	VU	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Rhampholeon moyeri	E	NE	0	0	0	0	0	0	0	0	0	1	0	1	1	**3**
	Rhampholeon temporalis	NE	VU	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
	Rhampholeon uluguruensis	E	VU	0	0	0	0	0	0	1	1	1	1	0	0	0	**4**
	Rhampholeon viridis	E	NE	0	1	1	1	0	0	0	0	0	0	0	0	0	**3**
	Rhinotyphlops nigrocandidus	E	NE	0	0	0	0	0	0	0	0	1	0	0	1	0	**2**
	Rieppeleon brevicaudatus	NE	NE	0	0	0	0	1	0	1	0	1	1	0	1	1	**6**
	Scelotes uluguruensis	E	NE	0	0	0	0	1	0	1	0	1	0	0	1	0	**4**
	Tetradactylus udzungwensis	E	NE	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Thelotornis usambaricus	NE	NE	0	0	0	0	1	0	1	0	1	0	0	0	0	**3**
	Typhlops gierrai	E	NE	0	0	0	1	1	0	1	0	0	0	0	0	0	**3**
	Typhlops uluguruensis	E	NE	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Typhlops usambaricus	E	NE	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Urocotyledon rasmusseni	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Urocotyledon wolterstorffi	NE	NE	0	0	1	0	1	0	1	0	1	0	0	0	0	**4**
	Xyelodontophis uluguruensis	E	NE	0	0	0	0	0	0	1	0	1	0	0	0	1	**3**
Birds	*Andropadus chlorigula*	NE	LC	0	0	0	0	0	0	1	1	0	1	0	1	0	**4**
	Andropadus masukuensis	NE	LC	0	0	1	1	1	1	1	1	1	1	0	1	1	**10**
	Andropadus milanjensis	NE	LC	0	0	0	1	1	1	1	0	1	0	0	1	1	**7**
	Andropadus neumanii	E	LC	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Anthreptes pallidigaster	NE	EN	0	0	0	1	1	0	0	0	0	0	0	1	0	**3**
	Anthreptes rubritorques	E	VU	0	0	0	1	1	1	1	0	1	0	0	1	0	**6**
	Apalis chapini	NE	LC	0	0	0	0	1	1	1	1	1	1	0	1	0	**7**
	Apalis chariessa	NE	VU	0	0	0	0	0	0	0	0	1	0	0	1	0	**2**
	Apalis fuscigularis	E	CR	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Arcanator orostruthus	NE	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Artisornis metopias	NE	LC	0	0	1	1	1	1	1	1	1	1	0	1	0	**9**
	Artisornis moreaui	NE	CR	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
	Batis crypta	NE	LC	0	0	0	0	0	1	1	1	0	1	0	0	0	**4**
	Batis mixta	NE	LC	0	0	1	1	1	1	0	0	1	1	0	1	1	**8**
	Bubo vosseleri	E	VU	0	0	0	0	1	1	1	0	1	1	0	1	1	**7**
	Cinnyricinclus femoralis	NE	VU	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
	Cisticola nigriloris	NE	LC	0	0	0	0	0	0	0	1	0	1	0	1	0	**3**
	Cisticola njombe	NE	LC	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**

Taxa	Species	Endemism	Threat (Red List 2009)	Taita	N. Pare	S. Pare	W. Usambara	E. Usambara	Nguu	Nguru	Ukaguru	Uluguru	Rubeho	Malundwe	Udzungwa	Mahenge	Number of blocks
	Hyliota usambarae	E	EN	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Laniarius fuelleborni	NE	LC	0	0	0	1	1	1	1	0	1	1	0	1	0	**7**
	Laniarius marwitzi	NE	LC	0	0	0	0	0	0	0	1	0	1	0	0	0	**2**
	Malaconotus alius	E	CR	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Modulatrix stictigula	NE	LC	0	0	0	1	1	1	1	1	1	1	0	1	0	**8**
	Nectarinia fuelleborni	E	NE	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Nectarinia loveridgei	E	EN	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Nectarinia moreaui	E	NT	0	0	1	0	1	1	1	1	0	1	0	1	0	**7**
	Nectarinia rufipennis	E	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Nectarinia usambarica	E	NE	0	0	1	1	0	0	0	0	0	0	0	0	0	**2**
	Oriolus chlorocephalus	NE	LC	0	0	0	1	1	1	1	0	1	1	0	1	0	**7**
	Ploceus nicolli	E	EN	0	0	0	1	1	0	0	0	1	1	0	1	0	**5**
	Poeoptera kenricki	NE	LC	0	1	0	1	1	1	1	1	1	1	0	1	0	**9**
	Scepomycter winifredae	E	VU	0	0	0	0	0	0	1	1	1	1	0	0	0	**4**
	Serinus melanochrous	NE	LC	0	0	0	0	0	0	0	1	0	1	0	1	0	**3**
	Serinus whytii	NE	LC	0	0	0	0	0	0	0	0	0	1	0	1	0	**2**
	Sheppardia aurantiithorax	E	EN	0	0	0	0	0	0	0	1	0	1	0	0	0	**2**
	Sheppardia gunningi	NE	NT	0	0	0	0	1	1	0	0	1	0	0	0	0	**3**
	Sheppardia lowei	NE	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Sheppardia montana	E	EN	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Sheppardia sharpei	NE	LC	0	0	1	1	1	1	1	0	1	1	0	1	1	**9**
	Stactolaema olivacea	NE	LC	0	0	1	1	1	1	1	1	1	1	0	1	1	**10**
	Swynnertonia swynnertoni	NE	VU	0	0	0	0	1	0	0	0	0	0	0	1	0	**2**
	Turdus helleri	E	CR	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Turdus roehli	E	NE	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Xenoperdix obscurata	E	EN	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Xenoperdix udzungwensis	E	EN	0	0	0	0	0	0	0	0	0	1	0	1	0	**2**
	Zosterops silvanus	E	EN	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Zosterops winifredae	E	VU	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
Amphib-ians	*Afrixalus uluguruensis*	NE	VU	0	0	0	1	1	1	1	1	0	1	0	1	1	**8**
	Afrixalus morerei	E	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Arthroleptides martiensseni	NE	EN	0	0	0	0	1	0	1	0	1	0	0	1	0	**4**
	Arthroleptides yakusini	E	EN	0	0	0	0	0	0	1	0	1	1	0	1	1	**5**
	Arthroleptites sp	E		0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
	Arthroleptis affinis	NE	LC	0	0	1	1	1	0	1	0	1	1	0	1	0	**7**
	Arthroleptis nguruensis	E	NE	0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Arthroleptis reichei	NE	NT	0	0	0	0	0	0	1	0	1	1	0	1	1	**5**
	Arthroleptis nikeae	E	EN	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Arthroleptis tanneri	E	VU	0	0	0	1	1	0	1	0	0	0	0	0	0	**3**
	Arthroleptis xenodactylus	NE	VU	0	0	0	0	1	0	1	0	1	0	0	1	0	**4**
	Boulengerula boulengeri	E	LC	0	0	0	1	1	0	0	0	0	0	0	0	0	**2**
	Boulengerula niedeni	E	CR	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Boulengerula taitanus	E	LC	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
	Boulengerula uluguruensis	E	LC	0	0	0	0	0	0	1	0	1	0	0	0	0	**2**
	Boulengerula sp.	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Amietophrynus brauni	E	EN	0	0	0	1	1	0	1	0	1	0	0	1	0	**5**
	Mertensophryne uzunguensis	NE	VU	0	0	0	0	1	0	0	0	0	0	0	1	0	**2**
	Callulina kisiwamsitu	E	EN	0	0	1	1	0	0	0	0	0	0	0	0	0	**2**
	Callulina kreffti	NE	LC	0	1	0	1	1	0	1	0	1	0	0	1	0	**6**
	Callunlina sp.1	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Callulina sp.2	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Callulina sp.3	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Callulina sp.4	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Churamiti maridadi	E	CR	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**

Taxa	Species	Endemism	Threat (Red List 2009)	Taita	N. Pare	S. Pare	W. Usambara	E. Usambara	Nguu	Nguru	Ukaguru	Uluguru	Rubeho	Malundwe	Udzungwa	Mahenge	Number of blocks
	Hoplophryne rogersi	E	EN	0	0	0	0	1	0	1	0	0	0	0	0	0	**2**
	Hoplophryne uluguruensis	E	VU	0	0	0	0	0	1	1	0	1	0	0	1	0	**4**
	Hoplophryne sp.	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Hyperolius kihangensis	E	EN	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Hyperolius puncticulatus	NE	EN	0	0	0	1	1	1	1	1	1	1	0	1	1	**9**
	Hyperolius sp. (puncticulatus–like)	NE	EN	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Hyperolius minutissimus	NE	VU	0	0	0	0	0	0	0	0	0	1	0	0	0	**1**
	Hyperolius spinigularis	NE	LC	0	0	0	1	1	0	1	0	1	0	0	1	0	**5**
	Hyperolius tannerorum	E	EN	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Hyperolius tornieri	E	DD	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Leptopelis barbouri	NE	VU	0	0	0	1	1	0	1	1	1	1	0	1	0	**7**
	Leptopelis uluguruensis	E	VU	0	0	0	1	1	1	1	0	1	1	0	1	1	**8**
	Leptopelis vermiculatus	NE	VU	0	1	0	1	1	1	1	1	1	0	0	1	1	**9**
	Leptopelis parkeri	E	VU	0	0	1	1	1	0	1	0	1	0	0	1	0	**6**
	Nectophrynoides asperginis	E	CR	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Leptopelis sp.	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Nectophrynoides cryptus	E	EN	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Nectophrynoides frontierei	E	DD	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Nectophrynoides laevis	E	DD	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Nectophrynoides laticeps	E	EN	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
	Nectophrynoides minutus	E	EN	0	0	0	0	0	0	0	0	1	1	0	0	0	**2**
	Nectophrynoides poyntoni	E	CR	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Nectophrynoides pseudotornieri	E	EN	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Nectophrynoides tornieri	NE	LC	0	0	0	1	1	0	1	0	1	0	0	1	1	**6**
	Nectophrynoides vestergaardi	E	EN	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
	Nectophrynoides viviparus	NE	VU	0	0	0	0	0	0	0	0	1	1	0	1	0	**3**
	Nectophrynoides wendyae	E	CR	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Nectophrynoides sp.1	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Nectophrynoides sp.2	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Nectophrynoides sp.3	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Nectophrynoides sp.4	E		0	0	0	0	0	0	1	0	0	0	0	0	0	**1**
	Parhoplophryne usambarica	E	CR	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
	Phlyctimantis keithae	E	VU	0	0	0	0	0	0	0	0	0	0	0	1	0	**1**
	Phrynobatrachus kreffti	E	EN	0	1	0	1	1	0	0	0	0	0	0	0	0	**3**
	Phrynobatrachus uzungwensis	E	VU	0	0	0	0	0	1	1	1	1	0	0	1	1	**6**
	Probreviceps durirostris	E	EN	0	0	0	0	0	0	0	1	0	0	0	0	0	**1**
	Probreviceps macrodactylus	NE	VU	0	0	0	1	1	0	1	0	1	0	0	1	0	**5**
	Probreviceps rungwensis	NE	VU	0	0	0	0	0	0	0	0	0	1	0	1	1	**3**
	Probreviceps uluguruensis	E	VU	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Scolecomorphus kirkii	NE	LC	0	0	0	0	0	0	1	1	0	1	0	1	1	**5**
	Scolecomorphus uluguruensis	E	LC	0	0	0	0	0	0	0	0	1	0	0	0	0	**1**
	Scolecomorphus vittatus	E	LC	0	1	0	0	1	0	1	0	0	0	1	1	0	**5**
	Spelaeophryne methneri	NE	LC	0	0	0	0	0	0	0	0	1	0	0	1	1	**3**
	Stephopaedes usambarae	E	EN	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**

ANNEX 3. EASTERN ARC MOUNTAINS: PROTECTED AREAS LIST

Sites are listed in order of their respective sizes. Sites included within the serial nomination are shaded.

ID	Name of site	Current Designation	Future designation	Size in Ha	Mountain block	District	Owner / manager	Buffer zones
11	Udzungwa Mountains	National Park	National Park	199,000	Udzungwa	Kilolo / Kilombero	TANAPA	Kilombero NR, farmland
10	Kilombero	Nature Reserve	Nature Reserve	134,511	Udzungwa	Kilombero	FBD	Udzungwa NP, farmland
42	Ukwiva	Forest Reserve	Forest Reserve	78,780	Rubeho	Kilosa	FBD	farmland
9	Uzungwa Scarp	Forest Reserve	Nature Reserve (with issue of Mngeta corridor to Kilombero NR included)	32,763	Udzungwa	Mufindi, Kilombero	FBD	farmland (some corridor potential)
13	Uluguru	Nature Reserve	Nature Reserve	24,000	Uluguru	Morogoro, Mvomero	FBD	farmland
4.1	Mkingu	Forest Reserve	Nature Reserve	23,388	Nguru	Mvomero	FBD	Farmland, Mkindo FR
19	Mufindi Scarp	Forest Reserve	Forest Reserve	16,737	Udzungwa	Mufindi	FBD	farmland, tea estate
12	Mamiwa North and South	Forest Reserve	Forest Reserve	15,178	Ukaguru	Kilosa	FBD	farmland
8	Chome	Forest Reserve	Nature Reserve	14,283	South Pare	Pare	FBD	farmland
6	Nguru North (could also be linked to Kilindi)	Forest Reserve	Forest Reserve	14,042	Nguu	Kilindi	FBD	farmland
50	Kising'a Lugalo	Forest Reserve	Forest Reserve	14,000	Udzungwa	Kilolo	FBD	farmland
49	Brook Bond	Private	Private	12,000	Udzungwa		Unilever	?
41	Palaulanga	Forest Reserve	Forest Reserve (proposed corridor to Mikumi NP)	10,620	Rubeho	Kilosa	FBD	farmland, Wami WMA
15	Magamba	Forest Reserve	Nature Reserve	8,700	West Usambara	Lushoto	FBD	farmland

2	Amani	Nature Reserve	Nature Reserve	8,380	East Usambara	Muheza	FBD	farmland, tea and teak estate, Derema proposed FR
14	Shagayu	Forest Reserve	Forest Reserve	7,830	West Usambara	Lushoto	FBD	farmland
1	Nilo	Nature Reserve	Nature Reserve	6,225	East Usambara	Korogwe	FBD	farmland
48	Image	Forest Reserve	Forest Reserve	4,897	Udzungwa	Kilolo	T.T	farmland
18	Kilindi	Forest Reserve	Forest Reserve	4,299	Nguu	Kilindi	FBD	farmland
17	Mhindulo Block (Bamba, Kwamgumi, Segoma)	Forest Reserves	Forest Reserve	4,120	East Usambara	Mkinga	FBD	cocoa and orange estate, farmland
47	New Dagaba Ulongambi	Forest Reserve	Forest Reserve	3,728	Udzungwa	Kilolo	FBD	farmland
40	Mramba	Forest Reserve	Forest Reserve	3,355	North Pare	Mwanga	FBD	farmland
7	Mafwomero	Forest Reserve	Forest Reserve	3,237	Rubeho	Mpwapwa	FBD	farmland
16	Mtai	Forest Reserve	Forest Reserve	3,107	East Usambara	Mkinga	FBD	farmland
102	Ihang'ana	Forest Reserve	Forest Reserve	2,882	Udzungwa		FBD	?
23	Kigogo	Forest Reserve	Forest Reserve	2,522	Udzungwa	Mufindi	FBD	farmland
63	Mafi Hill	Forest Reserve	Forest Reserve	2,509	West Usambara outlier		FBD	?
3	Sali	Forest Reserve	Forest Reserve	1,890	Mahenge	Ulanga	FBD	farmland
5	Kanga	Forest Reserve	Forest Reserve	1,890	Nguru	Mvomero	FBD	farmland
32	Segoma	Forest Reserve	Forest Reserve	1,506	E. Usambara		FBD	farmland
17	Kwamgumi	Forest Reserve	Forest Reserve	1,137	East Usambara	Mkinga	FBD	cocoa and orange estate, farmland
65	Bamba	Forest Reserve	Forest Reserve	1,109	E. Usambara		FBD	?
151	Kilanzi Kitungulu			1,100	Udzungwa	Kilolo	FBD	?
24	Kambai	Forest Reserve	Forest Reserve	1,050	E. Usambara		FBD	?

46	Mufindi Tea	Private	Private	1,000	Udzungwa		Lonrho	?
121	Kimala	Forest Reserve	Forest Reserve	1,000	Udzunwga	Kilolo	Proposed	?
64	Longuza Teak plantation	Forest Reserve	Forest Reserve	996	E. Usambara		FBD	?
120	Kitonga	Forest Reserve	Forest Reserve	629	Udzunwga	Kilolo	Proposed	?
21	Kimboza	Forest Reserve	Forest Reserve	405	Uluguru	Morogoro	FBD	farmland, Ruvu FR
30	Magrotto (estate)	Private	Private	215	E. Usambara		Private	?
45	Lulanda	Forest Reserve	Forest Reserve	197	Udzungwa		Local	?
99	Kibao	Forest Reserve	Forest Reserve	108	Udzungwa	Mufindi	FBD	?
37	Mikumi National Park (Malundwe Hill)	Forest Reserve	Forest Reserve	100	Malundwe	Morogoro	National Park	?
119	Kawemba	Forest Reserve	Forest Reserve	58	Udzunwga	Kilolo	FBD	?
31	Bombo West	Forest Reserve	Forest Reserve		E. Usambara	Korogwe	FBD	?
36	Derema	Forest Reserve	Forest Reserve		E. Usambara		Proposed	?
26	Manga	Forest Reserve	Forest Reserve		E. Usambara		FBD	?
34	Mlinga	Forest Reserve	Forest Reserve		E. Usambara		FBD	?
35	Mlungui	Forest Reserve	Forest Reserve		E. Usambara		Proposed	?
22	Mtai	Forest Reserve	Forest Reserve		E. Usambara		FBD	?
33	Semdoe	Forest Reserve	Forest Reserve		E. Usambara		FBD	?
66	Ligamba	Forest Reserve	Forest Reserve		Mahenge	Ulanga	FBD	?
67	Mahenge scarp	Forest Reserve	Forest Reserve		Mahenge		FBD	?
68	Mselezi	Forest Reserve	Forest Reserve		Mahenge		FBD	?
69	Muhulu	Forest Reserve	Forest Reserve		Mahenge		FBD	?
70	Myoe	Forest Reserve	Forest Reserve		Mahenge		FBD	?
71	Nawenge	Forest Reserve	Forest Reserve		Mahenge		FBD	?
76	Kamwella I	Forest Reserve	Forest Reserve		N. Pare		Proposed	?
77	Kamwella II	Forest Reserve	Forest Reserve		N. Pare		Proposed	?

72	Kindoroko	Forest Reserve	Forest Reserve		N. Pare	Mwanga	FBD	?
75	Kiverenge	Forest Reserve	Forest Reserve		N. Pare		Proposed	farmland
73	Minja	Forest Reserve	Forest Reserve		N. Pare		FBD	?
74	Mramba	Forest Reserve	Forest Reserve		N. Pare		FBD	?
78	Magotwe	Forest Reserve	Forest Reserve		Nguru?		FBD	?
81	Derema	Forest Reserve	Forest Reserve		Nguu		FBD	farmland
39	Kwediboma	Forest Reserve	Forest Reserve		Nguu		FBD	?
80	Mbwegere	Forest Reserve	Forest Reserve		Nguu		FBD	?
79	Mkongo	Forest Reserve	Forest Reserve		Nguu		FBD	?
82	Pumula	Forest Reserve	Forest Reserve		Nguu		FBD	farmland
29	Ilole forest	Forest Reserve	Forest Reserve		Rubeho		No Status	?
28	Ipondelo	No status	Forest Reserve		Rubeho	Mpwapwa	FBD	?
43	Mangalisa	Forest Reserve	Forest Reserve		Rubeho	Mpwapwa	FBD	farmland
83	Wota	Forest Reserve	Forest Reserve		Rubeho	Mpwapwa	FBD	farmland
84	Chambogo	Forest Reserve	Forest Reserve		S. Pare	Same	FBD	?
94	Dido	Forest Reserve	Forest Reserve		S. Pare		Proposed VFR	?
96	Ishereto	Forest Reserve	Forest Reserve		S. Pare		Proposed VFR	?
116	Iwonde	Forest Reserve	Forest Reserve		Udzungwa	Kilombero	FBD	?
117	Iyondo	Forest Reserve	Forest Reserve		Udzungwa		FBD	?
104	Njerera (Luhega)	Forest Reserve	Forest Reserve		Udzungwa		FBD	?
51	Nyanganje	Forest Reserve	Forest Reserve		Udzungwa		FBD	?
103	Ulagambi	Forest Reserve	Forest Reserve		Udzungwa	Kilolo	FBD	?
122	Kitemele	Forest Reserve	Forest Reserve		Udzunwga	Kilolo	FBD	?
123	Ikwamba	Forest Reserve	Forest Reserve		Ukaguru	Kilosa	FBD	?
124	Mamboto	Forest Reserve	Forest Reserve		Ukaguru		FBD	?
125	Mamboya	Forest Reserve	Forest Reserve		Ukaguru		FBD	?
25	Mamiwa Kisara South	Forest Reserve	Forest Reserve		Ukaguru		FBD	?
126	Uponera	Forest Reserve	Forest Reserve		Ukaguru		FBD	?
127	Kasanga	Forest Reserve	Forest Reserve		Uluguru		FBD	?
129	Shikurufumi	Forest Reserve	Forest Reserve		Uluguru		FBD	?

131	Dindili	Forest Reserve	Forest Reserve		Uluguru (outlier)		FBD	?
132	Kitulang'halo	Forest Reserve	Forest Reserve		Uluguru (outlier)		FBD	?
133	Mindu	Forest Reserve	Forest Reserve		Uluguru (outlier)		FBD	?
27	Mkungwe	Forest Reserve	Forest Reserve		Uluguru (outlier)		FBD	?
130	Nguru ya Ndege	Forest Reserve	Forest Reserve		Uluguru (outlier)		FBD	?
61	Ambangulu	Private	Private		W. Usambara		Private forest	?
135	Baga -II	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
60	Balangai East	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
54	Balangai West	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
57	Bumba Mavumbi	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
149	Dindira	Private	Private		W. Usambara		Private forest	?
139	Kikongoloi	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
53	Kisima Gonja	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
56	Kisimagonja	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
62	Lutindi (KKKT)	Private	Private		W. Usambara		Private forest	?
138	Mahezangulu	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
140	Manka	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
147	Mgombani	Forest Reserve	Forest Reserve		W. Usambara		FBD	?

136	Mkusu	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
137	Mweni Gombero	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
134	Mzinga	Forest Reserve	Forest Reserve		W. Usambara	Lushoto	FBD	?
55	Ndelemai	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
148	Ndolwa	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
146	Vugiri	Forest Reserve	Forest Reserve		W. Usambara		FBD	?
150	Mahenzangulu	Forest Reserve	Forest Reserve		W. Usambara outlier		FBD	?

ANNEX 4. PHOTOGRAPHS OF THE NINE SITES

Chome Nature Reserve

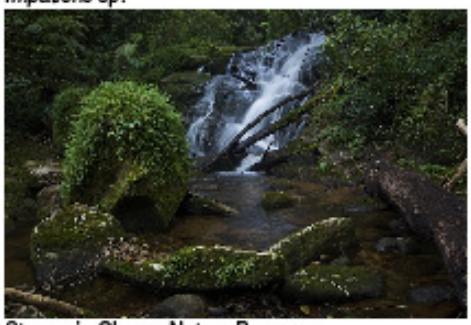
Rhampholeon viridis

Leptopelis barbouri

Callulina sp.

Impatiens sp.

Leptopelis barbouri



Stream in Chome Nature Reserve

Forest view of Chome Nature Reserve

Logging around Chome Nature Reserve

Magamba Nature Reserve

Forest interior, West Usambara Mountains

Community tree planting in the West Usambara Mountains

Forest view, Magamba

Bradypodion spinosum in the West Usambara Mountains

East Usambara Mountain block including Amani and Nilo Nature Reserves

Forest view

Chamaeleo deremensis

Precis octavia

Visitors centre at Amani Nature Reserve

Entrance to Amani Nature Reserve

Amani Nature Reserve Headquarters

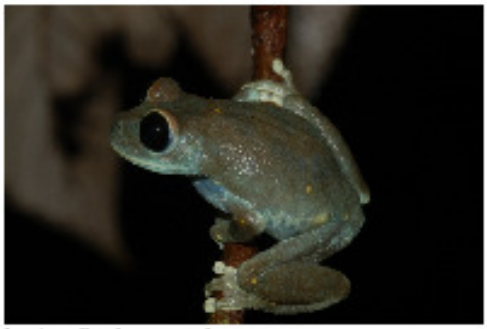
Uluguru Nature Reserve

Mrs Moreau's warbler

Huluhulu Waterfall in Uluguru

Afrixalus uluguruensis

View of Uluguru Nature Reserve



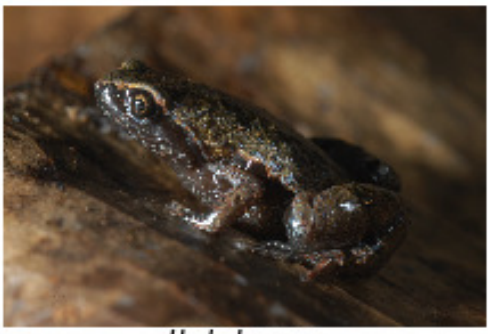
Leptopelis uluguruensis

Lukwangule Plateau

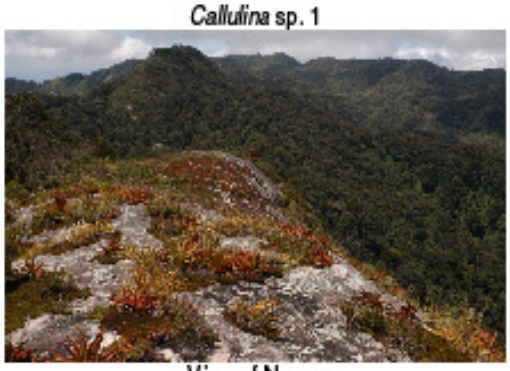
Mkingu Nature Reserve

Saintpaulia sp.

Callulina sp. 1



Hoplophryne sp.



View of Nguru

Nectophrynoides sp.

Callulina sp. 2

Boulengerula uluguruensis

View of Mkingu

Kilombero Nature Reserve

Galagoides orinus

Rhynchocyon uzungwensis

View of forest interior, Kilombero NR

View of montane grassland in Kilombero NR

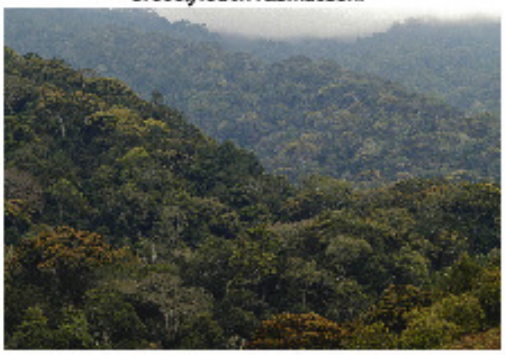
Udzungwa Mountains National Park

Elephant

Iringa red colobus

Sanje mangabey

Urocotyledon rasmusseni



Montane grassland and forest

Forest canopy in Udzungwa Mountains National Park

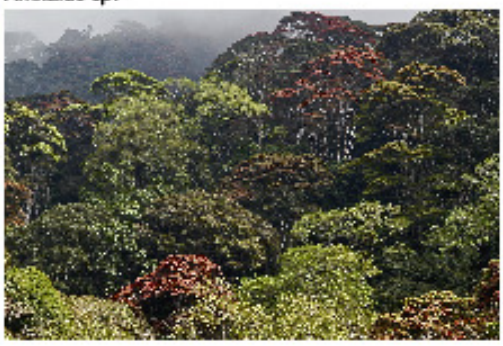
Uzungwa Scarp Nature Reserve

Lycophidion uzungwensis

Leptopelis barbouri

Chamaeleo tempeli

Afrixalus sp.



Chamaeleo laterispinis

Epomophorus wahlbergi

Forest view, Uzungwa Scarp

View of Kihansi Falls