

## **UPDATE ON THE STATUS OF FORESTS AND BIODIVERSITY VALUES IN THE ULUGURU MOUNTAINS**

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Since 1999 the Wildlife Conservation Society of Tanzania has been managing a conservation in the Uluguru Mountains as a collaboration between WCST, the Uluguru Mountains Agriculture Development Project (based at Sokoine University), the Regional Natural Resources Office and the Regional Catchment Forest Project Office. The project is supported by the Danish Ornithological Society through the BirdLife International partnership with WCST and the funding is provided by DANIDA.

The project aims to build the capacity of WCST to manage conservation programmes involved in forest conservation, and also to improve the conservation status of the Uluguru Mountain forests and the livelihoods of the people living around the forests. The project site was chosen because it contains biodiversity of global importance, and also because it is the most important water catchment area in Tanzania as all the water for the Ruvu river which supplies Dar es Salaam originates in the Ulugurus. Combined these values make the Ulugurus a major conservation priority in Tanzania.

One of the problems in the conservation of the Ulugurus is the general lack of up-to-date information on the status of the biodiversity, the area of forest and its condition, the number of villages and villagers living close to the forest and their activities and how these impact on the conservation of the Uluguru forests. This is partially due to the past sensitivities which surrounded access to these forests, and also partially due to the rugged terrain and a disastrous soil conservation project which operated in the area in the 1950s and which resulted in bad feelings towards projects from within the Uluguru people for many years. Fortunately these things have all changed and now it is very possible to work in almost all parts of the Ulugurus and to get a welcome reception from the Uluguru people.

This article presents some of the recently collected data on the forests and biodiversity values of the Uluguru Mountains. Later articles will address conservation interventions and how it is hoped that they will be able to tackle some of the problems which have been found.

### **Results of recent data collection**

#### Status of Uluguru Forests

The Uluguru forests have declined greatly since historical times. Formerly forest would have been extensive on the eastern slopes and would have stretched from the lowland Kimboza and Ruvu forest reserves up to the tops of the Ulugurus. Over the past several hundred of years almost all the lower altitude forests has been cleared and replaced with farmland and villages. The maximum former extent of forest is hard to quantify precisely, but in 1955 and 1977 detailed aerial photographs were taken of the entire area. These have allowed a much more precise estimate of the extent of remaining forest at these times (see Figure 1). This has been updated by ground

survey of remaining forests in 2000, and a final estimate of what the likely area of forest remaining will be if all the forest outside the reserves on the Ulugurus is cleared. This analysis indicates a decline from around 500 sq km historically to close to 230 sq km today and perhaps declining to 200 sq km within the next 10 years.

The geographical distribution of the montane forests has been mapped and comparison between the situation in 1955 and the area of the reserves shows where the main forest losses have been (Figure 2). Forest loss has been, and still is most severe in the Kitundu Hills above Tandai village in Mkuyuni Division. This forest loss has been due to a loss of authority by the traditional chief Kingalu who formerly controlled the area and more recently through opening up the area for banana growing by the local villages. All the bananas are transported to Dar es Salaam to feed the growing population there (indeed more than 50% of Dar's vegetables and fruit are reputed to come from the Ulugurus). This area has the most severe deforestation problems seen anywhere in the Ulugurus, and it is here that forest conservation efforts must be concentrated in the short term.

Surveys have been undertaken of all the 22 Forest Reserves and more than 50 other small forest patches in the farmlands around the Ulugurus. Forest Reserves contain almost all the larger patches of forest, and they have varying degrees of degradation (Table 1). The two largest and most important reserves are Uluguru North and Uluguru South forest reserves (Figure 2), almost connected by the smaller Bunduki reserves. The other reserves are found on the slopes of the Ulugurus and in the foothills and are generally much smaller and often quite badly degraded (Table 1). The Catchment Forest Project of central government manages most of the reserves, but there are a few local authority reserves as well. The latter are generally in a worse state of degradation than the Catchment Reserves, and some of the Local Authority reserves have been claimed by the local village for their own use. Ungazetted forests remain in sacred forest, mission forest, village forest, and forest of unknown status in the farmlands (often on areas which cannot be farmed due to rocks). In total these ungazetted forests cover less than 20 sq km and many of them are largely plantations and hence their biodiversity values and also water catchment values are lower than the natural forests.

Boundary surveys of the main Uluguru Forest Reserves are proceeding and indicate that in most places the farmland areas now reach the forest boundary (in the past there was a buffer of forest outside the boundaries). In some cases the farms have encroached inside the boundary, and the edge is generally heavily degraded by local people collecting poles, fuelwood and other useful materials. These boundary surveys are an essential first step in identifying where the most serious conservation problems within the reserves lie.

#### Status of the Ulugurus Biodiversity

As one of the aims of the current project is to conserve the biodiversity values, these needed to first be compiled and then some field surveys undertaken to assess whether the biodiversity values are intact, or if species have been lost or are in danger of being lost. Over the past 18 months the WCST project has compiled existing data and also undertaken surveys of species in all the forest reserves outlined above. Some of these surveys have been specifically focussed on single species, such as the endemic

Uluguru Bush Shrike and Loveridge's Sunbird, but others have been general biodiversity surveys aiming to locate as many of the species of reptiles, frogs, birds, mammals and plants as possible within a limited field period. A brief assessment of the status of the Uluguru Mountains biodiversity is presented below (see also Table 2):

*Birds.* The two Uluguru Mountains endemic birds have all been found to be present in good numbers. The population of the Uluguru Bush Shrike is over 1000 pairs, and Loveridge's Sunbird is perhaps as many as 10,000 pairs. These are both increases on previously reported figures. However, the Uluguru Bush Shrike is confined to the Uluguru North FR and forests outside this reserve where it prefers forests between 1300 and 1700 m. Because much of the unreserved forest over the Kitundu Hills is being cleared the population of this bird will decline in the future (Figure 2). Moreover, three bird species reported decades ago are seemingly no-longer found in the Ulugurus, presumably due to the decline in the area of forest, especially sub-montane forest. Two of these are Eastern Arc endemic species (Banded Green Sunbird and Tanzanian Mountain Weaver). This gives cause for some concern about the long-term future of the Uluguru Bush Shrike in particular.

*Mammals.* The Ulugurus contains a couple of endemic shrews, which have been relocated recently. Recent research indicates that it also supports probably the largest global population of the Eastern Arc endemic Mountain Galago, perhaps as many as 23,000 animals. The globally threatened Abbots Duiker is also found in the mountain forest, where it is hunted and locals say it is confined to the deep forest areas.

*Reptiles.* Of the four strictly endemic reptiles in the Ulugurus, three of them (all snakes) have not been relocated during the biological surveys. Two of them are burrowing forms and hence they are probably still found in the area. However, the other snake is a red-headed form (*Prosymna ornatissima*) which was previously found in the forests around 700-1000 m altitude where areas where there is little forest now remaining. Further investigations are required to determine if this species still survives in the Ulugurus, with the most likely place being the lower altitude portions of Uluguru North FR.

*Amphibians.* The Ulugurus contain six endemic species of amphibians. Specimens collected over the past year require confirmation of identifications, but it seems that all the endemic species previously reported are still present in the Uluguru forests. Moreover, recent work indicates that there may be further endemic or near-endemic amphibians to be found and hence the final identifications for the species collected recently in the Ulugurus are awaited with some interest.

*Plants.* An assessment of available literature and herbaria in Tanzania indicates that there are 108 species of plant endemic to the Uluguru Mountains, and a lot more Eastern Arc endemics shared with other sites. Further checking is needed to confirm that all 108 species are confined to the Ulugurus, and it is expected that the total of strict endemics will decline somewhat. Nonetheless this is a very impressive number of endemics, especially when they are added to the 7 endemic species of endemic bryophytes.

### Altitudinal distribution of species

A summary of the altitudinal distribution of the endemic species of the Ulugurus (Figure 3) shows that most are known from the montane forest band. This is mainly protected inside the Uluguru North and Uluguru South Catchment forest reserves. Other endemic species are found in the upper montane forest which is also well protected and in the lowland forests (which basically means the Kimboza and Ruvu forest reserves).

Additional species are confined to the sub-montane forests and it is these species (as indicated above) which are the most highly threatened on the Ulugurus. The sub-montane zone has been heavily deforested over the historical past, and this trend continued between 1955 and 1977 (Figure 4), and this process is still continuing. Our data indicate that a significant number of plants and animals are potentially threatened by extinction due to this loss of sub-montane forest and our failure to locate them in 2000 does not help this prediction.

### **Future plans**

In terms of understanding the forest status and biodiversity values of the Ulugurus, we have made a start and gathered some important data. However, the fact that we have failed to locate some of the known endemic species of this mountain gives considerable cause for concern. Targeted surveys searching for these species could throw further light on whether they survive, or have become extinct in the Ulugurus and hence globally.

Our list of endemic plants is very tentative and we have no idea if the species survive in the wild. At least two of the endemics are only known from the Kitundu Hills and as this is rapidly being deforested and underplanted with bananas we could also fear that there is a risk of global extinction for some of the plants.

For most of the other species we do not know anything about their ecology, population status, or the nature of any threats to their survival. These would form good research topics for Tanzanian students of biology.

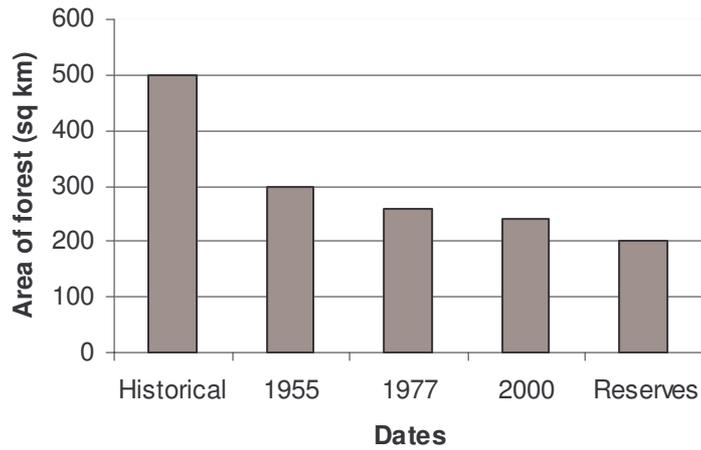
A final worrying point is that a number of recent studies have indicated that as forest area declines then the risk of extinction for the species remaining in those forests increases. Even more concerning is that there is a time-delay between the deforestation which reduces the forest area, and the extinction of the species, and this can be some decades in duration. Hence, even if the population of, for example, the Uluguru Bush Shrike looks moderately safe at the present time, the effects of the current deforestation may continue to reduce the population for many years and can lead to extinction even if deforestation is halted. Such predictions, based on analysis of the best available data, make us realise that the loss of further areas of forest from the Eastern Arc Mountains in general and the Ulugurus in particular can have consequences well into the future. Moreover, if there is a lag time to extinction, there may well be a lag time in climatic changes around these mountains, with potentially huge effects on the residents of Dar es Salaam (whose water comes from the Ulugurus) and Tanzania in general.

Table 1. Forest Reserves of the Ulugurus, with notes on their current status

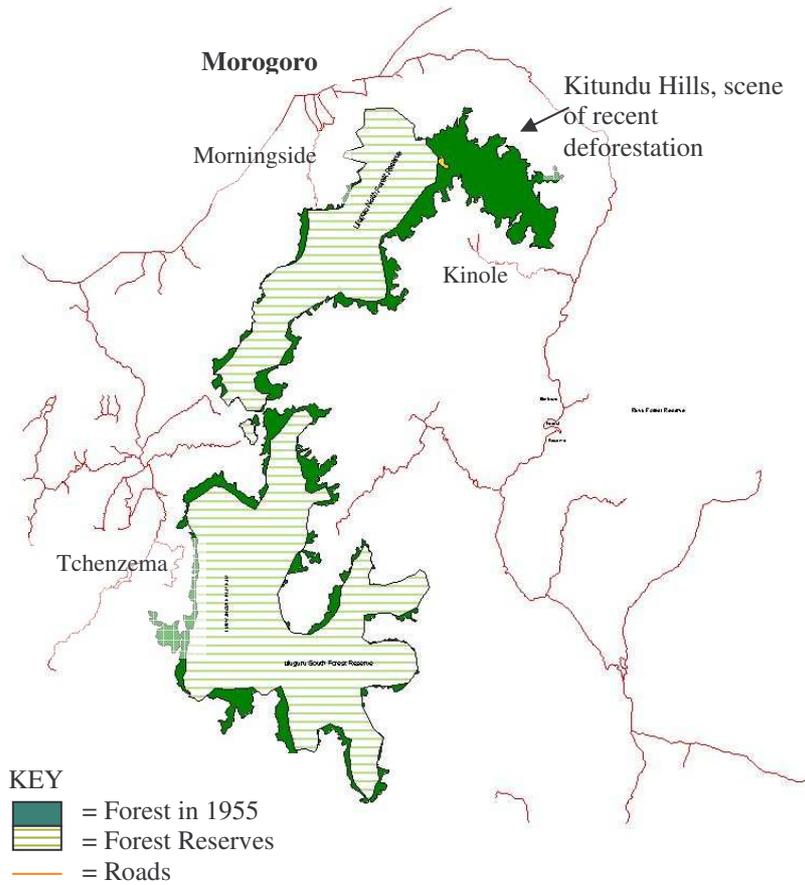
| Name of Forest Reserve | Ownership | Area in hectares |          |   |
|------------------------|-----------|------------------|----------|---|
| BUNDUKI I-III          | T.T.      | 111.0            |          | Plantation and natural forest which is being logged on licence.   |
| BUNDUKI IV             | T.T.      | 6.1              |          | Plantation and natural forest which is being logged on licence.   |
| BUNDUKI V              | T.T.      | 3.7              |          | Plantation and natural forest which is being logged on licence.   |
| BUNDUKI VI             | T.T.      | 2.6              |          | Plantation and natural forest which is being logged on licence.   |
| CHAMANYANI             | T.T.      | 796              |          | Mainly woodland with a few riverine forest strips. A little tree cutting.   |
| KASANGA                | T.T.      | 70.0             |          | Mainly a plantation, but with some natural forest regrowth. Being logged and farmed.  |
| KIMBOZA                | T.T.      | 385.9            |          | Some natural forest and some plantation. Joint Forest Management experiments here.  |
| KONGA                  | T.T.      | 5.3              |          | Degazetted and now managed by the village. Good lowland patch, with some tree cutting.  |
| MKUNGWE                | T.T.      |                  | 1,966.8  | Lowland to sub-montane forest in good condition. Some new pitsawing.  |
| MVUHA                  | T.T.      | 141.6            | 710.0    | Mainly woodland with a few riverine forest strips. A little tree cutting.   |
| NYANDIDUMA             | T.T.      | 47.8             |          | A plantation of <i>Eucalyptus</i> which is being cut.   |
| NYANDRIA               | T.T.      |                  | 194.8    | A plantation of <i>Eucalyptus</i> which is being cut.   |
| PALANGWE EAST          | T.T.      | 768.5            |          | Woodland which burns ever year.   |
| PALANGWE WEST          | T.T.      | 184.0            |          | Woodland which burns ever year.   |
| RUVU                   | T.T.      |                  | 3,093.5  | Woodland and lowland forest. A lot of mining damage and some tree cutting.  |
| SHINKURUFUMI           | T.T.      |                  | 260.0    | Plantation and secondary forest.  |
| ULUGURU NORTH          | T.T.      |                  | 8,356.7  | Large area of submontane to upper montane forest. Farmland encroachment and illegal hunting, pitsawing and fuel and pole gathering.                   |
| ULUGURU SOUTH          | T.T.      |                  | 17,292.7 | Large area of montane to upper montane forest with some grasslands. Farmland encroachment and illegal hunting, pitsawing and fuel and pole gathering. |
| VIGOZA                 | T.T.      | 9.3              |          | Former plantation, now cleared and farmed.  |
| MAHAGALA FR            | L.A.      | 34.8             |          | Local authority reserve largely managed by the village with lowland forest under threat from farmland conversion.                                     |
| NGABAULA FR            | L.A.      | ?                |          | Local authority reserve largely managed by the village with lowland forest under threat from farmland conversion                                      |
| KIPUNGULI FR           | L.A.      | ?                |          | Local authority reserve largely managed by the village with lowland forest under threat from farmland conversion                                      |
| KITUNDU/KINOLE         | none      |                  |          | Former chief forest, now heavily logged, underplanted with banana and converted to fields of maize and various other crops. Endangered!               |

Table 2. Species of birds, mammals, reptiles and amphibians endemic to the Uluguru Mountains and notes on their altitudinal distribution and most recent records

| Species                           | Described                 | Alt Distribution | Most recent records, plus notes on abundance     |
|-----------------------------------|---------------------------|------------------|--|
| <b>BIRDS</b>                      |                           |                  |  |
| <i>Malaconotus alius</i>          | Friedmann, 1927           | 1320-1710 m      | 2000, pop c.1,000 pairs                          |
| <i>Nectarinia loveridgei</i>      | Hartert, 1922             | 1200-2580 m      | 2000, pop 10,000 plus pairs                      |
| <b>MAMMALS</b>                    |                           |                  |  |
| <i>Crocidura telfordi</i>         | Hutterer, 1986            |                  | 1990s collected by B. Stanley                    |
| <i>Myosorex geata</i>             | Allen & Loveridge, 1927   |                  | 1990s collected by B. Stanley                    |
| <b>REPTILES</b>                   |                           |                  |  |
| <i>Prosymna ornatissima</i>       | Barbour & Loveridge, 1928 | 700-1000 m       | Last collected 1926, Mt. Tongoni (Uluguru North) |
| <i>Lygodactylus williamsi</i>     | Loveridge, 1952           | c.250-300 m      | Seen 2000  |
| <i>Rhampholeon uluguruensis</i>   | Tilbury & Emmrich, 1996   |                  | Collected 2000                                   |
| <i>Typhlops uluguruensis</i>      | Barbour & Loveridge, 1928 | 750m             | Last collected 1926, Bagilo                      |
| <i>Typhlops</i> sp. nov.          | Broadley in prep.         | c.750m           | Last collected 1926, Bagilo                      |
| <b>AMPHIBIANS</b>                 |                           |                  |  |
| <i>Nectophrynoides cryptus</i>    | Perret, 1971              | 1500 m plus      | ?collected 2000, U. South.                       |
| <i>Nectophrynoides minutus</i>    | Perret, 1972              | 1500 m plus?     | Collected 2000, U. South                         |
| <i>Probreviceps uluguruensis</i>  | Loveridge, 1925           | 1500 m plus      | Collected 2000, U. South                         |
| <i>Scolecophorus uluguruensis</i> | Barbour & Loveridge, 1928 | 1500 m plus      | ?collected 2000, U. North                        |
| <i>Boulengerula uluguruensis</i>  | Barbour & Loveridge, 1928 | 1500 m plus      | ?collected 2000, U. North                        |
| <i>Hyperolius tornieri</i>        | Ahl, 1931                 | 1500 m plus      | Taxonomically problematic                        |



*Figure 1. Changes in the area of forest on the Uluguru Mountains. 'Historical' is estimated from climate and the extent of lowland forest patches which are assumed to have been originally joined. 'Reserves' is an estimate of the minimum forest area if the present reserves are maintained, with little encroachment, but all forest outside is lost (around 20 sq km of the Uluguru Forest reserves is upland grassland and some is rock).*



*Figure 2. Forest cover in 1955 in the vicinity of Uluguru North (top), Bunduki (middle) and Uluguru South (bottom) Catchment Forest Reserves. Forest is now almost confined to the Forest Reserves, except on the southern margin of Uluguru South, and some fragments.*

Figure 3: Altitudinal Distribution of Uluguru Mountains Strict Endemic Animals (above) and Plants (below)

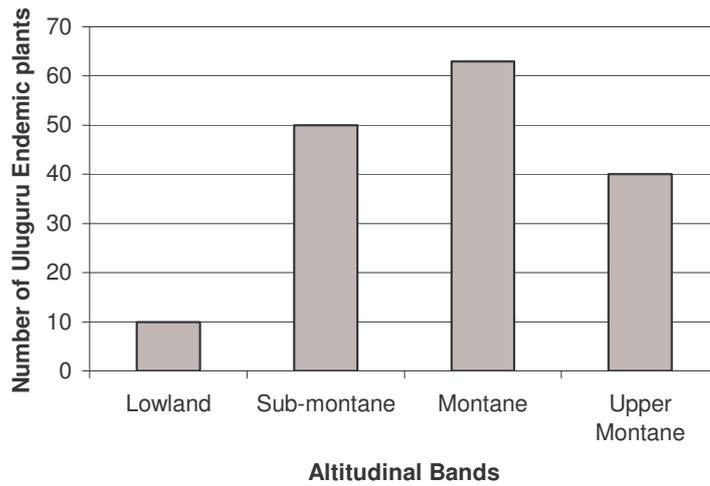
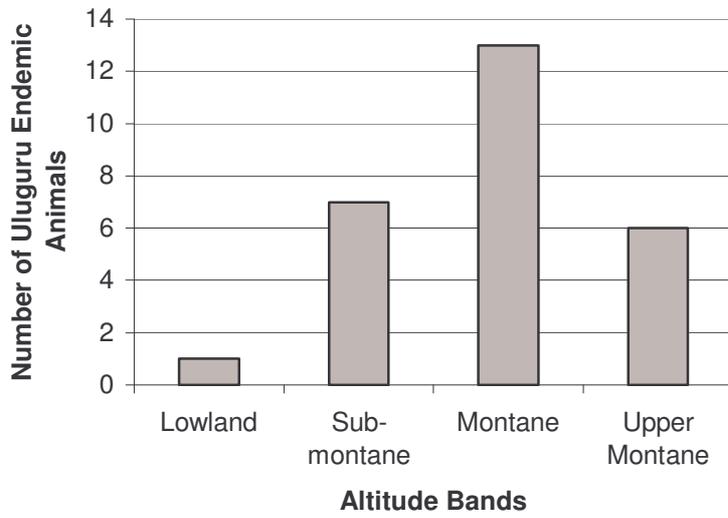


Figure 5. Altitudinal distribution of montane forests in the Uluguru Mountains, 1955 and 1977, illustrating the greatest forest loss between 700 and 1700 m, and very little forest loss above this altitude.

