

# CEPF SMALL GRANT FINAL PROJECT COMPLETION REPORT

## I. BASIC DATA

**Organization Legal Name:** The Field Museum

**Project Title (as stated in the grant agreement):** Population Estimates of Threatened Birds in the East Usambara Mountains, Tanzania

**Implementation Partners for This Project:** Wildlife Conservation Society of Tanzania

**Project Dates (as stated in the grant agreement):** December 1, 2005 - May 31, 2008

**Date of Report (month/year):** March 2008



Wildlife Conservation  
Society of Tanzania

## II. OPENING REMARKS

**Provide any opening remarks that may assist in the review of this report.**

The primary goal of this project is to obtain **population estimates** of some of the globally threatened bird species occurring in the East Usambara Mountains, many of which remain poorly known ecologically. Even for those few species that have been the object of more intensive studies, the available population estimates are outdated and require further verification through more robust sampling. We targeted five species (Fischer's turaco *Tauraco fischeri*, Long-billed tailorbird *Orthotomus moreaui*, Usambara thrush *Turdus (olivaceus) roehli*, Banded green sunbird *Anthreptes rubritorques*, Amani sunbird *Hedydipna pallidigastra*) for population monitoring at the landscape scale. A network of 320 sample stations, each of which was located with a GPS unit with an accuracy of about 10 meters was used to sample these species in disturbed forest, primary forest, and cultivated fields. Satellite imagery was used to generate habitat maps and ensure that the sample stations were evenly scattered across the study area. Three secondary goals of this project were to (i) determine the **habitat selection** of the targeted species, that is, what are the habitats that are most important for their conservation; (ii) create a long-term mechanism by which to examine future **population trends** (are respective populations increasing or decreasing?); and (iii) to increase the training infrastructure locally and thus enhance the sustainability of the monitoring project. This report covers the period September 2005 to December 2007.

**This report was compiled by:**

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### III. NARRATIVE QUESTIONS

1. What was the initial objective of this project?

Our objectives were to:

(A) Obtain population estimates of globally threatened bird species occurring in the submontane forest of the East Usambara Mts;

(B) Establish a long-term monitoring protocol that would feed directly into conservation initiatives for globally threatened bird species in the study area;

(C) Increase the scientific capacity locally.

Meeting objectives:

(A) Our early pilot study in December 2005 and January 2006 demonstrated that we should concentrate the first part of the survey on a small number of species. These species were chosen because they are among the most globally threatened or are believed to be the most easily observable ones in Amani Nature Reserve and surrounding forest. Comparison of the abundances of both commonly detected and rarer species is essential to determine factors that limit abundance and distribution across this landscape. The species initially chosen were as follows:

- Fischer's turaco *Tauraco fischeri* – Near Threatened, likely to be upgraded to Vulnerable
- Long-billed tailorbird *Orthotomus moreaui* – Critically Endangered
- Banded green sunbird *Anthreptes rubritorques* - Vulnerable
- Amani sunbird *Hedydipna pallidigastra* - Endangered
- Usambara Thrush *Turdus (olivaceus) roehli* – Likely to be upgraded to Vulnerable

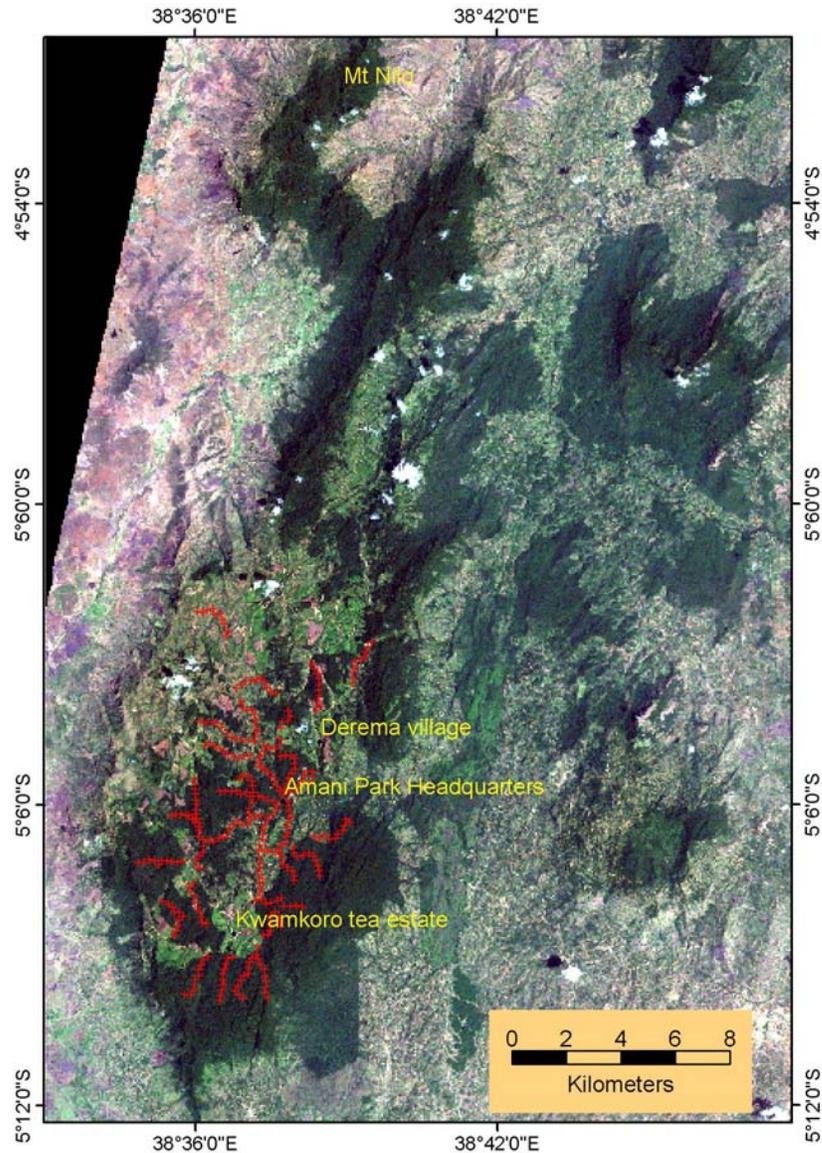
(B) Due to logistical difficulties in this terrain, we resorted to placing most census locations along transects that follow the existing network of trails and roads in the study area. We created 32 transects with 10 stations each separated at least 200 m from each other (i.e. a total of 320 census stations). GPS coordinates were obtained for census stations to enable relocation of stations for subsequent monitoring in the longer term. We have satisfactorily accessed these transects which will be sampled every two months henceforth to examine trends in populations of the targeted globally threatened bird species.

(C) The Wildlife Conservation Society of Tanzania has one new field manager through this project who plans to pursue a Master's of Science degree with these data in the near future. Two local villagers have been trained and regularly employed on this project, one of whom will soon step up into a more formal position within WCST. Former field and project coordinator from WCST, Mr Jasson John, will be conducting his doctorate work on the Long-billed Tailorbird and will use this project as a launching pad. The WCST has, through collaboration with the BirdLife Species Guardian and Mr Luca Borghesio, initiated a long-term conservation project directed at the Long-billed Tailorbird in the East Usambara Mts.

2. Did the objectives of your project change during implementation? If so, please explain why and how.

Our objectives remained generally the same, but for a couple of minor changes. The pilot study from 180 census stations sampled from December 2005 to January 2006 permitted the team to establish some preliminary ideas about habitat requirements that we will verify once the dataset becomes statistically robust at the end of this year (2008). Contact frequencies of all five species during the pilot study ranged between 0.1 and 0.4 individuals/census point, with estimated densities ranging between 5 (Long-billed tailorbird) to 25 pairs km<sup>2</sup> (Fischer's turaco). These figures suggested some conservation potential, especially for the Long-billed tailorbird. Even more interesting was that at least some of the species seemed to occur in noticeably high abundances in cultivated areas and disturbed forest. This preliminary result was of great conservation interest and we therefore established a further 14 transects (140 more census stations) to more evenly sample all the habitats in the broader area (Figure 1).

Because of logistical difficulties in sampling so many transects over a wide area, we restricted the initial monitoring to the southern part of the East Usambara plateau, mainly in Amani Nature Reserve (ANR) and surrounding habitats (Figure 1). We worked only in the submontane habitats (above 750 m a.s.l.) and within a radius of approximately 10km around Amani (approximately between Kimbo peak to the south and Kwezitu village to the north).



**Figure 1.** The Eastern Usambara in a 2001 LANDSAT image, showing the location of the 320 sample points arranged into 32 transects

3. How was your project successful in achieving the expected objectives?

Overview: In two years of monitoring, we have found that some of the threatened or narrowly distributed bird species we targeted will visit and forage in human-modified habitats. While Banded green sunbird, Fischer’s turaco and Amani sunbird were fairly common throughout the

range of habitats, the Usambara thrush was instead almost only observed in less disturbed forest tracts. With respect to the critically endangered long-billed tailorbird, we found it to be quite widespread and in more forest interior gaps than those reported by Cordeiro *et al.* (2001), and also in a number of secondary growth sites adjacent to forest. Even at this early stage of monitoring, our data suggests that the population of this species might be larger than the 150-200 individuals that were conservatively estimated by Cordeiro *et al.* (2001). This species occurs at some abundance in disturbed areas which are often host to dense *Lantana* bushes and remnant trees covered with vines; a habitat that is in itself removed by the tea estates in favour of establishing new *Eucalyptus* plantations (Figures 10-11). Furthermore, our data, as well as previously published information (McEntee *et al.* 2005), also demonstrates that the tailorbird inhabits gaps or edges within large patches of natural forest. This might be detrimental to the species because the introduced tree *Maesopsis eminii* regenerates very rapidly within forest gaps and closes them quickly, rapidly making them unsuitable for the tailorbird. We are currently monitoring territories in all these habitats to determine movement patterns, to track potential effects of *Maesopsis* gap domination, and to verify if removal of *Eucalyptus* trees and secondary growth such as *Lantana* is carried out by the tea plantations in this species' breeding season. The Wildlife Conservation Society of Tanzania is taking the lead role in this endeavour.

Habitat requirements: Our results depict a complex situation about the differential distribution and abundance of threatened or narrowly distributed species in the submontane forest of the East Usambaras. In particular, this monitoring program showed that traditional agricultural landscapes in the East Usambaras host surprisingly high numbers of species of conservation concern (including those we did not target: see Figure 7). Even relative abundances for some species were comparably high in the agricultural landscape. We acknowledge that our survey technique mainly targeted foraging individuals, and actually future efforts should catalogue breeding densities in the different environments. Nonetheless, traditional agricultural areas now provide a varied landscape environment, in which fields are intermixed with remnant forest trees and shrubland, where a rich avifauna can live (Naidoo 2004). These habitats have probably been part of the landscape of the East Usambaras for centuries, but their physical structure is now to a large extent dependent on the local and urban markets and on nationwide political choices (Conte 1999). Any intensification of agriculture leading to reduced tree cover or the substitution of the present mix of extensive polycultures with homogenous intensive monocultures will have detrimental effects on the bird assemblage, as we observed in the tea plantations, where both species diversity is extremely low and species of concern virtually absent.

Prognosis: During the first two years of operation, our monitoring program has been effective in yielding valuable ecological information on threatened birds of this region. The execution of the survey in the future will further augment the importance of our results, as we will be able to estimate year-to-year fluctuations in population size of some of the most threatened species in the area. Moreover, the monitoring technique that we have developed could easily be expanded to other sites within the Eastern Arc, and has the potential to eventually become a regular monitoring programme. As the experience in other countries already showed, countrywide bird monitoring exercises (such as the African Waterbird Count, which raised much attention on the situation of African wetlands) have a high value in catalyzing the public's attention on conservation issues.

We provide summary information on the targeted species below:

## TWO-YEAR SPECIES PROFILES

**Table 1.** List of Red-listed species and their average frequencies (number of individuals/point) in the four habitat types in the East Usambara Mts (sample size: 1996 point counts done from December 2005 to December 2007).

Common name	Undisturbed forest	Disturbed forest	Edge	Smallholder agriculture	Overall average
Fischer's Turaco	0.52	0.38	0.40	0.33	0.40
Usambara Thrush	0.24	0.18	0.02	0.00	0.10
Long-billed Tailorbird	0.07	0.03	0.06	0.01	0.04
Amani Sunbird	0.08	0.10	0.08	0.04	0.08
Banded Sunbird	0.16	0.18	0.41	0.33	0.29

### **Fischer's Turaco *Tauraco fischeri***

Fischer's Turaco is a restricted-range, Near-Threatened species endemic to the East African coast, from southern Somalia to northern Tanzania, but also penetrates inland to some mountain massifs in northern Tanzania, including the East Usambaras (Britton 1980). Concern was raised about this species, not only because of deforestation, which threatens its habitat, but also because large numbers of individuals were exported from Tanzania for the cage bird trade, to the point that the world's total remaining population was estimated to only 2,500 individuals in 1999 (BirdLife 2007b). Our results suggest that the current status of Fischer's turaco in the East Usambaras is better than previously thought. In the two years of work, we obtained more than 700 observations of this species, which allow us to estimate that the total population of Fischer's turaco in the East Usambara might be more than 5,000 individuals. Moreover, this species was observed in good numbers both in undisturbed forest and in agricultural habitats (0.5 and 0.3 individuals/sample station respectively, Table 1), suggesting a certain tolerance to habitat transformation (Figure 2). Turacos were regularly observed outside forest, even in very small patches of isolated trees, often planted by people, around watercourses and within the agricultural matrix. Dispersal between habitats is regularly observed.



**Figure 2.** Records of Fischer's turaco obtained during the survey (January 2006- November 2007) in the Amani section of the East Usambara Mountains.

**Usambara Thrush *Turdus (olivaceus) roehli***

Current systematics treat Usambara Thrush as a subspecies of the widespread Olive Thrush *T. olivaceus*; however, molecular analyses suggest that this taxon would be better considered a separate species, endemic to the North Pare and Usambara mountains (Bowie *et al.* 2005). Given clear differences in both vocalisations and ecology compared with the northern (*abyssinicus*) races, we believe that this taxonomic position is valid. We encountered the Usambara Thrush quite frequently (190 records in the first 24 months of field work), both in disturbed and undisturbed forest, but much more rarely along edges (Table 1, Figure 3) (see also Newmark 1991). This thrush is replaced by the congeneric Kurrichane Thrush *T. libonyanus* in cultivations adjacent to the forest. Despite its dependence on unfragmented forest with continuous forest canopy, which makes it sensitive to habitat disturbance, our data suggest that the Usambara thrush is still relatively common in the East Usambaras. Long-term mark-recapture studies in the study area suggest that the Usambara Thrush is undergoing a long-term decrease (Newmark 1991, 2006).

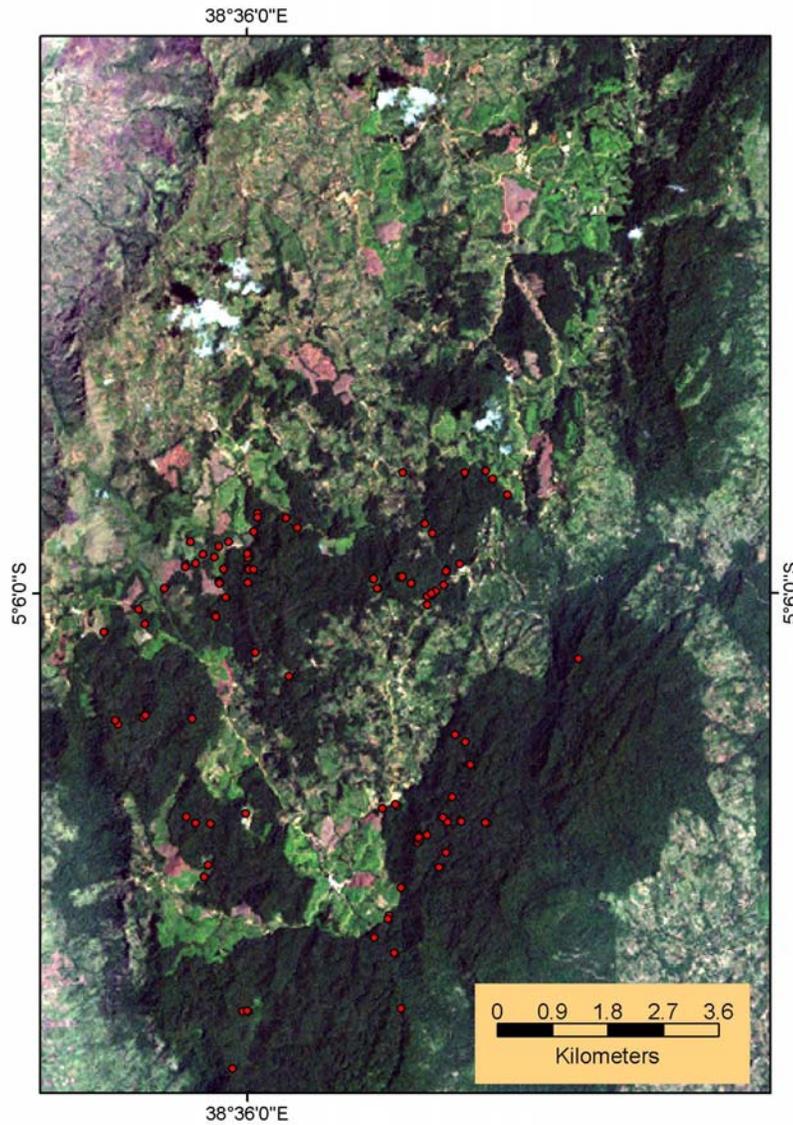


**Figure 3.** Records of Usambara Thrush in the Amani section of the East Usambara Mountains.

### **Long-billed Tailorbird *Orthotomus moreaui***

This enigmatic bird is Critically Endangered and known only from the East Usambaras and from a single locality in northern Mozambique (BirdLife 2007c, Ryan & Spottiswoode 2003). We obtained only four records during our preliminary counts, and prior experience suggested this method would severely underestimate its distribution and abundance (Cordeiro et al. 2001). It is a skulking species that is best detected when it sings or calls, which is infrequent. As a result we used playback of a recording of the species' vocalisations to elicit a response and provide a more accurate indication of its presence or absence (Borghesio et al. 2006). This allowed us to locate a further 60-70 territories within the study area (Figure 4). Of these territories, 14 were on forest edge and 18 in forest interior. Average sighting frequency was similar in undisturbed forest and along forest edges, while disturbed forest with high cover of *Maesopsis*, as well as agricultural mosaics far from the forest has clearly lower densities of this species (Table 1). In all observed cases, the canopy was open and the undergrowth was occupied by dense tangles of vines, climbers or *Lantana camara* (*Lantana* is invasive in this area).

Our data suggest that the Long-billed Tailorbird is relatively widespread within the study area (see also Cordeiro *et al.* 2001). Previous estimates of extreme rarity might in part be due to the difficulty to observe it, even when song playback is used. The species might be sensitive to forest fragmentation, as it has only been found in two of 12 small forest fragments sampled since 2000 (NJC, *pers. obs.* and see Newmark 1991), even when suitable microhabitat conditions appeared to be present (see McEntee et al. 2005). However, within forest, it is little affected by habitat degradation, as we often found it along powerline cuts and in gaps dominated by exotic shrubs. The Long-billed tailorbird selects early successional habitats (forest gaps with open canopy and dense undergrowth) and thus its conservation might depend on recurrent disturbance (e.g., landslides, floods, treefalls, selective logging) that creates forest gaps of appropriate size.



**Figure 4.** Records of Long-billed Tailorbird in the Amani section of the East Usambara Mountains.

### **Banded Sunbird *Anthreptes rubritorques***

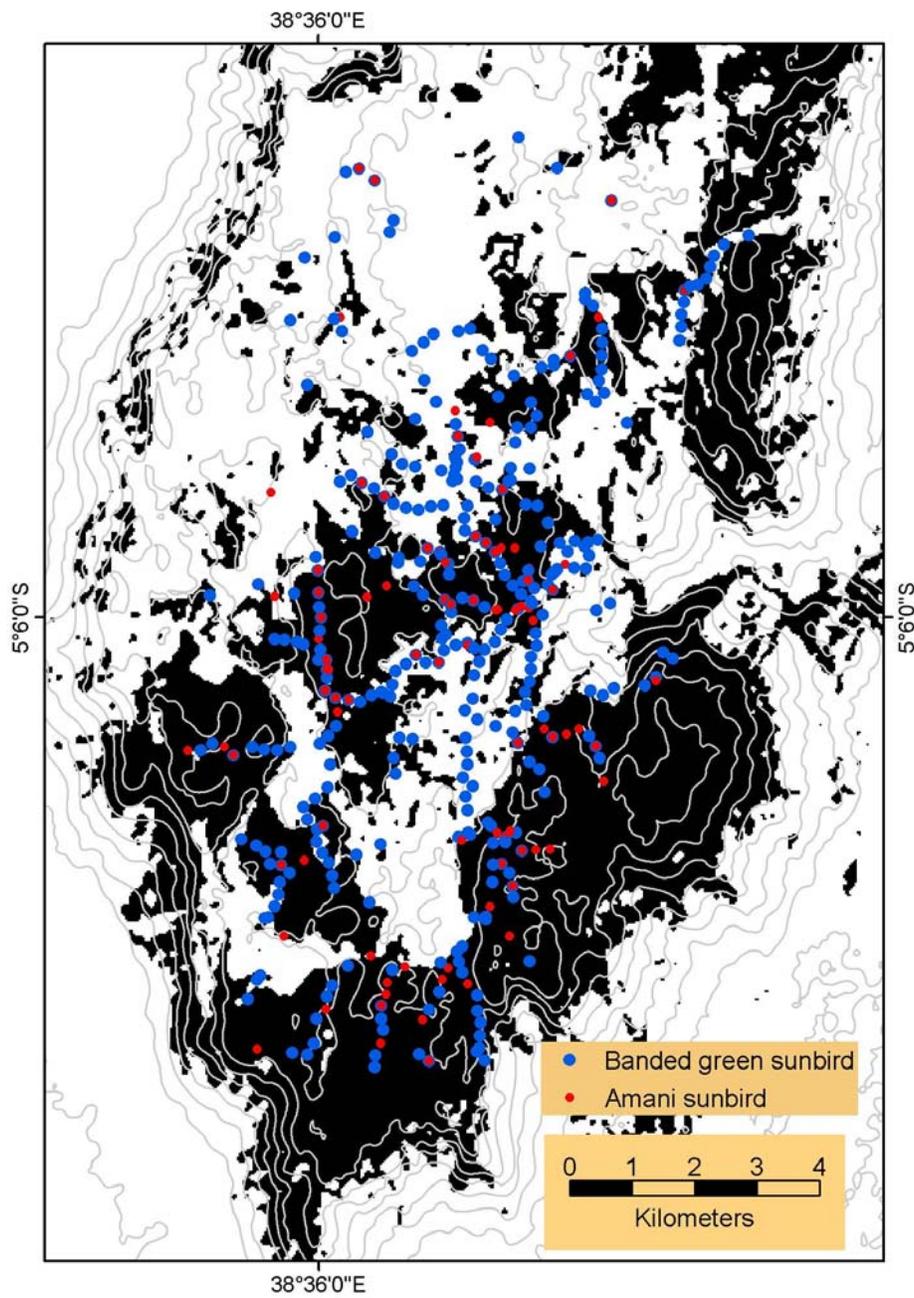
This restricted-range species, classified as Vulnerable, is endemic to the Eastern Arc Mountains of Tanzania. It has its main stronghold in the East Usambara range and possibly the West Usambara Mts; it appears to be uncommon in the other Eastern Arc forests (Ngurus, Ulugurus, West Usambaras: Britton 1980). This species was usually easy to detect due to its frequently uttered, penetrating call, which carried to more than 200 m. The Banded Sunbird was the most frequently encountered of our target species (627 observations gathered to date), in all habitats, but with a clear preference for edges and smallholder agriculture with sufficient numbers of large trees (Table 1, Figure 5). In September 2006 the species was very active and probably breeding: we observed several males singing from treetops and engaging in territorial behaviour. We found two nests, one under construction on 19 September 2007 on a tree planted by side of the road, in an open habitat near Amani village and one active on 22 December 2007 on a forest edge adjoining tea plantations.

### **Amani Sunbird *Hedydipna pallidigastra***

Amani Sunbird is more narrowly distributed than the previous species, with a population in Arabuko-Sokoke forest in south-east Kenya, one in the East Usambaras and another in the Udzungwas. It is Endangered according to BirdLife. This sunbird species was contacted less frequently than Banded Sunbird. However, as the call of this species is softer and less frequently uttered than that of the Banded Sunbird, usually only individuals at close range were recorded, while silent birds may have remained undetected. Amani Sunbird was observed with similar frequencies in all habitats (Table 1, Figure 5); however, it usually did not venture far into cultivated areas (maximum recorded distance from forest was c.800 m). A nest was found by one of us (JJ) in 2004 in a *Eucalyptus* plantation near Monga tea estate.

### **Other species**

Records of a number of other globally-threatened, near-threatened, or narrowly distributed species that were encountered in a more rigorous census (Borghesio et al., 2008), or otherwise opportunistically, were obtained. These records of six species (Southern Banded Snake Eagle *Circaetus fasciolatus*, Sharpe's Akalat *Sheppardia sharpei*, Spot-throat *Modulatrix stictigula* Dappled-throat *Modulatrix orostruthus*, Uluguru Violet-backed Sunbird *Anthreptes neglectus*, and Kenrick's Starling *Poeoptera kenricki*) will be augmented in future monitoring. None of these species inhabited the tea plantations (Figure 6), and appear to depend on intact forest tracts.



**Figure 5.** Records of Amani and Banded green sunbird in the Amani section of the East Usambara Mountains. In this map derived form a classified LANDSAT image, forest is shown in black

4. Did your team experience any disappointments or failures during implementation? If so, please explain and comment on how the team addressed these disappointments and/or failures.

The most significant difficulty was finding the right field coordinator. We interviewed and trained three young Tanzanians who had completed their undergraduate degrees at local universities. We lost two of these trainees in the early phases. Retraining new recruits affected the continuity of data collection in the early and middle phases of this monitoring project, but this was overcome through direct visits by the team and the engagement of the new WCST field coordinator and two excellent local villagers serving as research assistants.

5. Describe any positive or negative lessons learned from this project that would be useful to share with other organizations interested in implementing a similar project.

Two positive aspects of this project were: (1) A strong partnership developed between The Field Museum and the Wildlife Conservation Society of Tanzania. This relationship benefited both parties and personnel, and fostered positive outputs for conservation; (2) By including local villagers as part of the team, and liaising with local village leaders and the government forest management authority (Amani Nature Reserve), the project was executed more efficiently. Working with local communities is important and building trust by talking freely about the project and its goals, requesting permission to work in people's lands, and general positive behaviours with people increased the success of this project at all levels. We therefore hope that in a few years, the local communities and ANR can reap some fruits of this work.

6. Describe any follow-up activities related to this project.

This project is planned for the long-term and we are continuing to monitor threatened birds in the area by including more species, focusing more in-depth on one species (long-billed tailorbird), and expanding to Nilo in the north and Derema Corridor in the east. With a more robust sample size by the end of this year, we will have the statistical power to produce more reliable population estimates of the threatened birds of this region.

7. Please provide any additional information to assist CEPF in understanding any other aspects of your completed project.

In this report, we summarised preliminary findings about the habitat use and relative abundance of five globally-threatened bird species; subject to further funding for another year, we will have a sufficiently robust dataset to begin to statistically estimate abundances and population trends. We shared findings from this 24-month period to demonstrate that should this monitoring project continue, we will establish long-term population trends that are vital to monitor the conservation status of the endangered biota of this biodiversity hotspot. Few studies applied to the conservation of threatened species have taken a long-term approach where abundance can be linked to either or both temporal and spatial scales, and we hope that this will be one of the first such examples. In particular, the positive collaborations have now built a solid team on the ground to make this process sustainable, and eventually, replicable in other Eastern Arc forests.

#### IV. ADDITIONAL FUNDING

**Provide details of any additional donors who supported this project and any funding secured for the project as a result of the CEPF grant or success of the project.**

Donor	Type of Funding*	Amount	Notes
CEPA	A	€1450	Met additional field costs
British Ecological Society	B	£1250	Supported Borghesio multi-species census
African Bird Club	B	£675	Supported Borghesio multi-species census
ZGAP	B	€800	Supported Borghesio multi-species census
Conservation Corporation Africa	B	\$1500	Supported WCST to meet local needs
British Birdfair	C	£10000	For monitoring of Long-billed tailorbird to WCST

**\*Additional funding should be reported using the following categories:**

- A** *Project co-financing (Other donors contribute to the direct costs of this CEPF project)*
- B** *Complementary funding (Other donors contribute to partner organizations that are working on a project linked with this CEPF project)*
- C** *Grantee and Partner leveraging (Other donors contribute to your organization or a partner organization as a direct result of successes with this CEPF project.)*
- D** *Regional/Portfolio leveraging (Other donors make large investments in a region because of CEPF investment or successes related to this project.)*

Provide details of whether this project will continue in the future and if so, how any additional funding already secured or fundraising plans will help ensure its sustainability.

This project is ongoing for at least one more year (see above), and WCST plans to seek further funding for a long-term monitoring and training programme.

#### V. ADDITIONAL COMMENTS AND RECOMMENDATIONS

Our initial results suggest that the conservation of bird diversity in the East Usambaras might benefit from increased attention toward rural landscapes. Several recommendations have arisen that will improve this monitoring program further.

- 1) We recommend that specific conservation programs in the area of Amani Nature Reserve could benefit if the larger landscape features of this entire habitat mosaic are considered. These programs could include restoration of land using locally important indigenous species (such as *Allanblackia stuhlmannii*) in tree-planting near villages and houses. The latter is already planned through a network of partnerships under the umbrella of *Novella*. Moreover, economic incentives could be provided to stimulate more eco-compatible crops, such as coffee or cloves, rather than tea, as it is clear that intensive tea cultivations have no value to the local threatened fauna and that coffee, cloves and cinnamon cash-crops can be favourable to some species of conservation concern. This practice has begun in small-holder cultivations, and should be encouraged over complete monocultures such as tea.

- 2) Adding more bird species to monitor is a cost-efficient mechanism to obtain more resolution on how habitat influences the distribution and abundance of species of conservation concern. Our results indicate differential responses by the suite of species monitored thus far, and by increasing a few more species that are marginally threatened, we hope to better understand the chief threats to a wider pool of species. We consider that five to seven additional species will be added from the list below in 2008:
- Spot-throat *Modulatrix stictigula* – Least concern, locally scarce (ANR), Eastern Arc endemic
  - Sharpe's akalat *Sheppardia sharpei* – Unclassified, Eastern Arc endemic
  - White-chested alethe *Alethe fuelleborni* - Unclassified, Eastern Arc endemic
  - Dapple-throat *Modulatrix orostruthus* – Vulnerable, Eastern Arc endemic
  - Usambara hyliota *Hyliota (australis) usambarae* – Endangered, Usambara Endemic
  - Uluguru violet-backed sunbird *Anthreptes neglectus* – Least concern but restricted range and locally scarce
  - Pale-breasted Illadopsis *Illadopsis (rufipennis) distans* - Unclassified, Eastern Arc endemic
  - Usambara weaver *Ploceus nicolli* - Endangered, Eastern Arc endemic
  - Southern banded snake-eagle *Circaetus fasciolatus* - Near-threatened
- 3) Extending east to Derema corridor and north to Nilo Nature Reserve will increase detections of a number of species that are not present or so common in Amani Nature Reserve (e.g. Usambara hyliota, Tanzania mountain weaver, Spot-throat, Sharpe's akalat, and possibly Dapple-throat). This aspect has begun through more focused monitoring of the Long-billed tailorbird (see below).
- 4) Extending east to Derema corridor and north to Nilo Nature Reserve will also permit a better idea of the extent of the distribution of Long-billed tailorbird, one of the world's most critically endangered species. This aspect has just begun in 2008, and we hope to secure additional funding to complete this survey satisfactorily to 2010. Other species that are globally threatened will be easily counted on the tailorbird surveys, without compromising the protocols.
- 5) After approximately one more year of monitoring, the WCST team could begin to train new Tanzanian (and other African nationals) recruits on a rotating 3-month basis who could then spear-head similar protocols through the rest of the Eastern Arc Mountains (and elsewhere: see Figure 9 and the Field Manual that is also online with this report).

## VI. INFORMATION SHARING

CEPF aims to increase sharing of experiences, lessons learned and results among our grant recipients and the wider conservation and donor communities. One way we do this is by making the text of final project completion reports available on our Web site, [www.cepf.net](http://www.cepf.net), and by marketing these reports in our newsletter and other communications. Please indicate whether you would agree to publicly sharing your final project report with others in this way.

Yes    
 No

If yes, please also complete the following:

**For more information about this project, please contact:**

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- BirdLife International 2007c Species factsheet: *Apalis moreaui*. Downloaded from [www.birdlife.org](http://www.birdlife.org) on 23/11/2007
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## VIII. ACKNOWLEDGMENTS

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**Figure 6.** Large tea plantations are one characteristic feature of the East Usambaras. Tea plantations have very low bird species diversity and are one of the most important sources of concern for the conservation of endangered species (© Luca Borghesio).



**Figure 7.** An example of a rural area in the Amani area, East Usambaras. These landscapes are fine-grained mosaics of small fields, villages and remnants of natural forest (© Luca Borghesio).



**Figure 8.** Long-billed tailorbird in Amani. This individual was colour-ringed in November 2000 and retains the same territory up to January 2008. (© N.J. Cordeiro)



**Figure 9.** Most members of the team (left to right: Jasson John, Luca Borghesio, Elia Mulungu and Victor Mkongewa: © Luca Borghesio)



**Figure 10.** Some members of the team again, including a new member, using playback to attract long-billed tailorbird in a *Eucalyptus* plantation with secondary growth (left to right: Jasson John, Fadhili Njilima and Victor Mkongewa). Njilima is the current field coordinator from the Wildlife Conservation Society of Tanzania. Mkongewa is a research assistant whereas John is a field supervisor (© WCST).



**Figure 11.** Jasson John of the Wildlife Conservation Society of Tanzania with a long-billed tailorbird captured in a *Eucalyptus* plantation (© WCST).